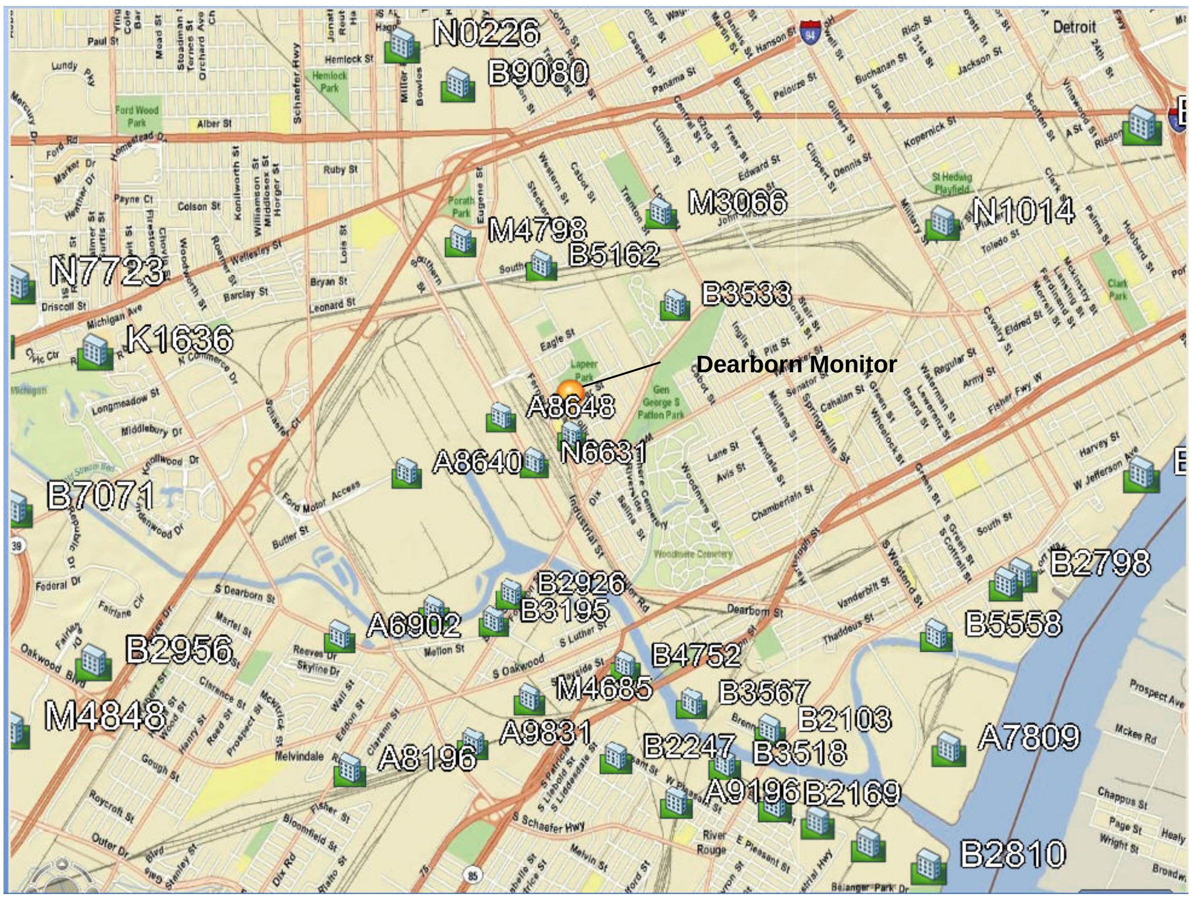
Appendix D

Stationary Source Facility Detail

Purpose of this Appendix

The information in this appendix was collected for the purpose of supplementing inventory data found in Section 5 of the main document. The data in this appendix was collected from company permits, Air Quality Division (AQD) field reports, special studies, and discussions with companies that are in the general vicinity of the Dearborn air monitor, which has the highest $PM_{2.5}$ values in Southeast Michigan. Figure 1 shows the location of emission sources around the Dearborn monitor. These sources will be discussed below. These sources include both large and smaller facilities. Most are still operating but some are closed.

Figure 1. Map of Emission Sources Near the Dearborn Monitor



List of Sources

SRN	Source	SRN	Source
A6902	Darling International Inc	B3533	Edw C Levy Co Plant 1
A7809	US Steel Great Lakes Works	B3567	St Mary's Cement
A8196	M-Lok Riley Plating – OOB*	B4752	Great Lakes Petroleum Terminal – OOB*
A8640	SeverStal North America	B5162	Xcel Steel Pickling (formerly Castle Steel)
A8648	Ford Motor Co. - Rouge Complex	B5558	Honeywell – OOB*
A9196	Fabricon Products Inc	B7071	Automotive Components Holding
A9831	Marathon-Ashland Oil Refinery	B9080	Envirosolids, LLC
B2103	Detroit Water and Sewerage Department	K1636	City of Dearborn
B2169	Carmeuse Lime, Inc. (River Rouge Facility)	M3066	Spartan Industrial – OOB*
B2247	Buckeye Terminals LLC (Detroit Terminal)	M4685	Detroit Salt
B2798	Detroit Edison Co. - Delray	M4798	Ferrous Environmental – OOB*
B2810	Detroit Edison Co. - River Rouge	M4848	Ford Motor Allen Park Clay Mine – OOB*
B2926	Sunoco Partners M & T, L.P. (River Rouge Terminal)	N0226	Hinkle MFG LLC
B2956	Ford Motor New Model Program	N1014	Magni Industries Inc
B3195	Cadillac Asphalt Products	N6631	Dearborn Industrial Generation
B3518	United States Gypsum Company	N7723	DTE Energy / Ford World Headquarters

* OOB means “Out of Business.”

The purpose of this source-by-source review is to better understand the types of facilities that may be impacting the $PM_{2.5}$ levels in the vicinity of the Dearborn monitor and activities at the facilities that may have contributed to emission changes over a period of years. Various parameters were acquired, including emissions information, operating schedules, distance and direction from the Dearborn monitor, stack heights, and product throughput.

An example of additional information that can be helpful in understanding emissions impacting the Dearborn area can be seen by comparing emissions inventories for 2005 to 2008 (see Tables 5 and 6 in the main document), NOx and SO_2 emissions from electric generating unit (EGU) and non-EGU point sources in the seven-county nonattainment area increase between 2005 and 2008 for the annual inventory. However, this may not reflect the changes that are occurring at sources that are in the more immediate vicinity of the Dearborn monitor. Some of these facilities may have reduced their emissions which may have a positive impact on $PM_{2.5}$ levels in the area, which is not obvious by the seven-county emissions data. In general, since local sources have a bigger impact on the nearby Dearborn monitor than more distant sources, they deserve to be analyzed in greater detail.

It should be noted that attempts were made to obtain detailed information for other sources as well. Sources throughout the seven-county nonattainment area were screened to determine permanent and enforceable reductions made between 2005 and 2008. However, emissions inventories and permits to install

(PTI) do not give clear indications of what controls are installed or when controls are installed. Therefore, it made the most sense to focus limited resources on analyzing sources near the Dearborn monitor.

Other Consideration - Emission Inventory Challenges of PM2.5

Using emission inventories for $PM_{2.5}$ and precursors is the primary metric required to demonstrate the reason for an area moving from nonattainment to attainment. This is detailed in Section 5 of the main document. The use of inventories brings some inherent issues described here and is the reason for considering other metrics of information in making a robust demonstration, as has been done in Section 6 of the main document and in this appendix. The Michigan Air Emissions Reporting System (MAERS) emissions inventory from 1998-2008 was evaluated. Emissions inventory trends are very difficult to interpret since the data is always changing. Companies may report emission units (reporting group or individual units), source classification codes (SCCs), etc. differently from year to year. In addition, emission factors that are used to calculate the emissions are frequently changed by the Environmental Protection Agency (EPA) as better data becomes available. If no emission factor is available, the company does not have to report emissions for that pollutant. The company may also use different methods for calculating emissions from year to year, including federal emission factory stack testing and continuous emission monitoring (CEM).

In the case of particulate matter (PM), major changes have occurred over the last ten years. In 1998, only PM-primary and PM_{10}-primary were reported. In 1999, a few companies voluntarily started reporting $PM_{2.5}$-primary. In 2002 PM-primary was no longer reported, only PM10-primary and $PM_{2.5}$-primary. In 2004, PM_{10}-filterable and $PM_{2.5}$-filterable started to be reported, thus, PM_{10}-primary, PM_{10}-filterable, $PM_{2.5}$-primary and $PM_{2.5}$-filterable are reported for each SCC. Each emissions unit may have more than one SCC and may report emissions for PM_{10} and/or $PM_{2.5}$ that are either filterable or primary.

Other Metrics Used

Emissions of primary $PM_{2.5}$ are obviously important when assessing a nearby facility's potential impacts on the monitor. Emissions of $PM_{2.5}$ precursors, SO2 and NOx, are also important to understand. Depending on the facility distance to the monitor, these precursors may have time to react to form $PM_{2.5}$ in the form of sulfates and nitrates. Stack heights are important because they affect dispersion of the pollutants. Tall stacks produce pollutant plumes that may not impact a nearby ground level monitor, but can influence a monitor at some distance away. Short stacks tend to have the opposite effect, impacting nearby sources.

Process throughput (or production) usually is a more consistent measure of what is happening at an industrial process than reported emissions when looking at trends. The emissions are often calculated based on throughput, but emission factors may change over time as described previously. However, throughput will not indicate decreases in emissions if control equipment is added.

The location of a facility relative to the Dearborn monitor is important. Wind, in the area are predominantly from the south and southwest, so sources located in this upwind direction from the monitor will have a much larger impact than sources in other directions. The proximity of a source to the monitor also can determine the level of impact the source may have. A facility's operating schedule can be informative, particularly if the facility has seasonal changes. For the daily $PM_{2.5}$ standard, high $PM_{2.5}$ levels occur more often in winter months, so a company's operating schedule could suggest higher or lower impacts to the Dearborn monitor during the more critical winter months.

Determining emission trends from a nearby facility is important in judging how the facility may have impacted $PM_{2.5}$ levels in the area over the 2005 – 2008 time period, which represents the change from not meeting the $PM_{2.5}$ standard to meeting the standard at the Dearborn monitor. However, throughput may provide an even clearer picture of a facility's impact in cases where emission data may be less reliable as described in the previous paragraphs. Reporting of throughput by a facility is usually a much more stable metric than emissions, and companies generally keep good records of throughput. Throughput trends therefore are also used to help understand changes in potential emission impacts from facilities near the Dearborn monitor. It should be noted that throughput does not account for controls that may be added to a process at a facility, resulting in lower emissions from the year the controls were added into the future. Aside from this, increases and decreases in throughput can be expected to result in increases and decreases in emissions.

In the following facility studies, emission trends are compared to throughput trends to help show reliability of emissions information (do emissions track with throughput?). Also, years when the two metrics diverge can show that additional controls may have been added.

Ultimately, these evaluations of facilities may provide insight into whether emissions reductions can be expected to be permanent or are fluctuations in throughput. One requirement of the redesignation state implementation plan (SIP) is to show that emission reductions that led to the area meeting the standard are permanent and enforceable, as described in Section 5 of the main document. These facility studies may provide some clues as to the source of reductions when this information is not readily available and whether reductions are permanent. The trends themselves also can provide insight on expectations for future emissions and impacts on the ambient air in the vicinity of the Dearborn monitor.

FACILITY DETAILS

Severstal

Severstal North America, Inc. operates an integrated steel mill at the Rouge Industrial Complex in Dearborn, Michigan. The Rouge Industrial Complex is located at 3001 Miller Road in Dearborn, Michigan (Wayne County). The complex is bounded by Rotunda Drive on the north, Miller Road on the east, Dix Avenue and Rouge River on the south, and Schaefer Road on the west. The area is mainly industrial, and the nearest residence is approximately 1500 ft east of Miller Road. This mill is less than one mile southeast of the Dearborn air monitoring station (Dearborn monitor).

Severstal operations cover approximately 500 acres, occupying the southern half of the Rouge complex. Operations include three blast furnaces (BFA, BFB, BFC) with only BFB currently operational, a waste oxides reclamation facility, a basic oxygen furnace (BOF) shop, two continuous casters, a hot strip mill, and cold mill operations. The plant produces sheet steel that is used in a variety of manufacturing applications. Ford Motor Company operates the remainder of the complex. Severstal North America, Inc. is independent of the Ford Motor Company and is an autonomous producer of steel.

The steel mill runs year around, 24 hours per day, seven days per week. The stack emission heights are generally over 150 ft for the major emissions units. The annealing furnaces have shorter stacks at 64 feet. A few minor emission sources have baghouse stacks ranging from 27 to 51 feet. Severstal may also have some areas of fugitive emissions that are not as well documented.

A review of the company's emission inventory data from 1998 through 2008 indicates that the facility's operations have decreased since approximately 2005. The BOF and the blast furnaces with their stoves are the major sources of emissions and throughput at Severstal.

Comparing emissions trends to throughput trends indicates that they generally match, but there is an occasional year that diverges (see Figure 2 to Figure 4). Emission factors used to calculate emissions for a process can be determined by the company, and they are occasionally revised. For example, Severstal used AP-42 factors for their blast furnace cast house operations in 1998, but in 1999-2007, they used stack test data from another steel mill. In 2008, they ran their own stack tests and are now using those values. Severstal has done additional on-site stack tests and will be using those results for future emissions reports. Thus throughput may more accurately represent emissions to ambient air over several years, unless controls are added.

Figure 2. BOF Emissions to Throughput Comparison at Severstal

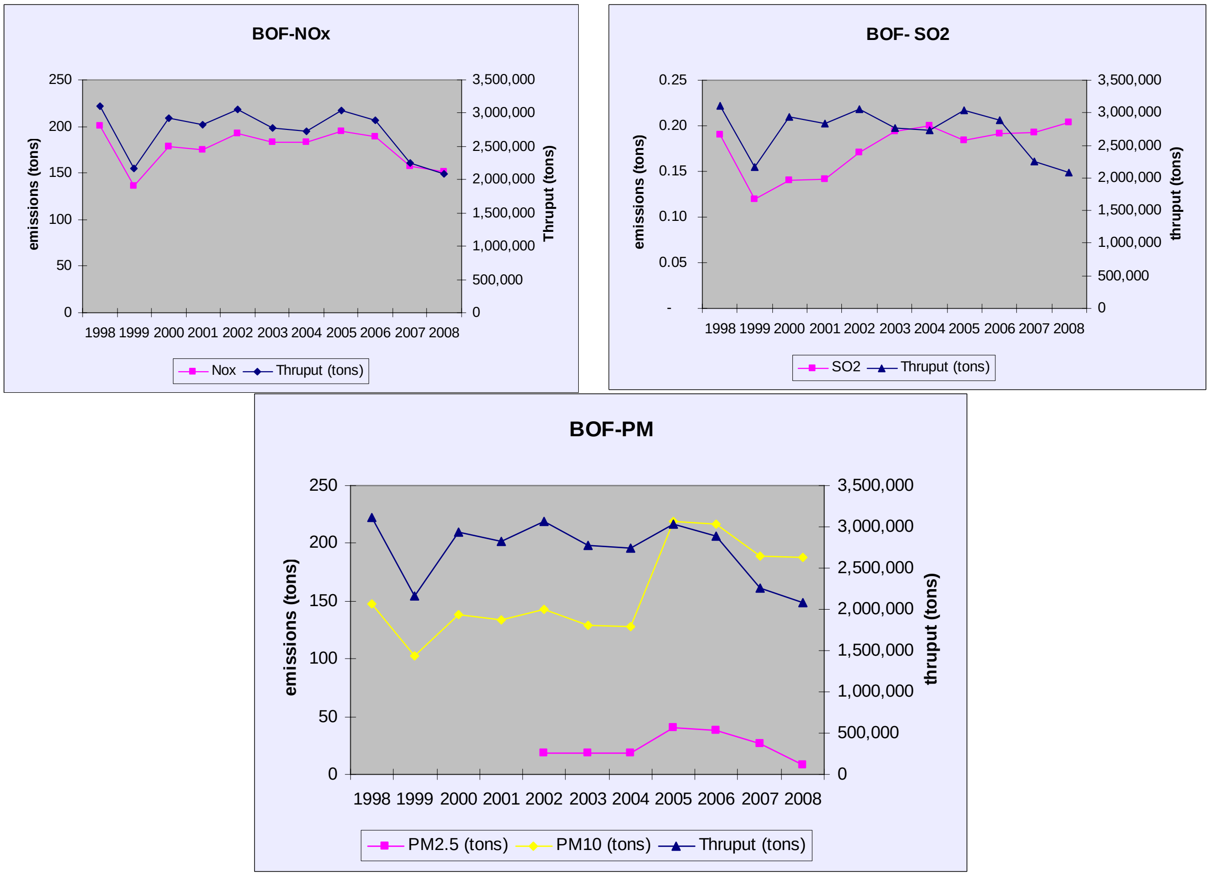
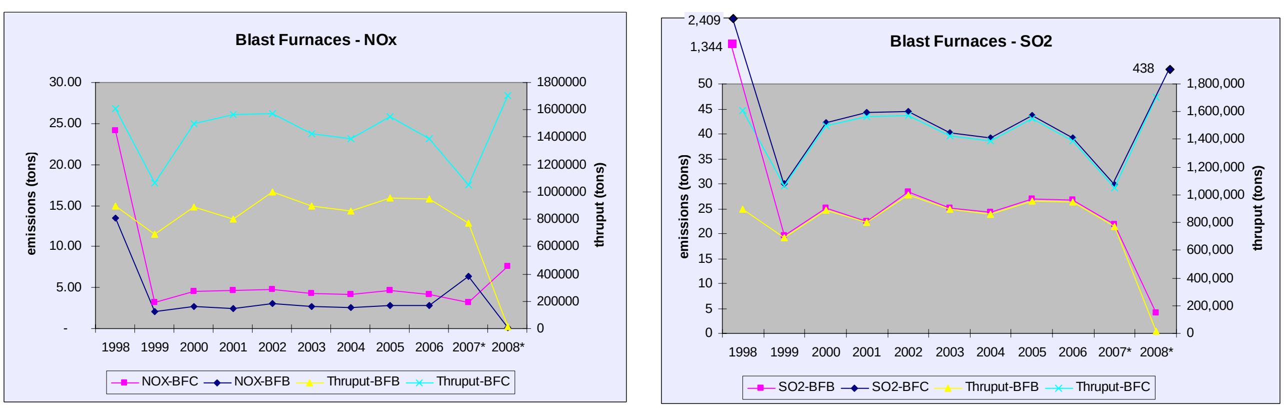


Figure 3. Blast Furnace Emissions to Throughput Comparisons at Severstal



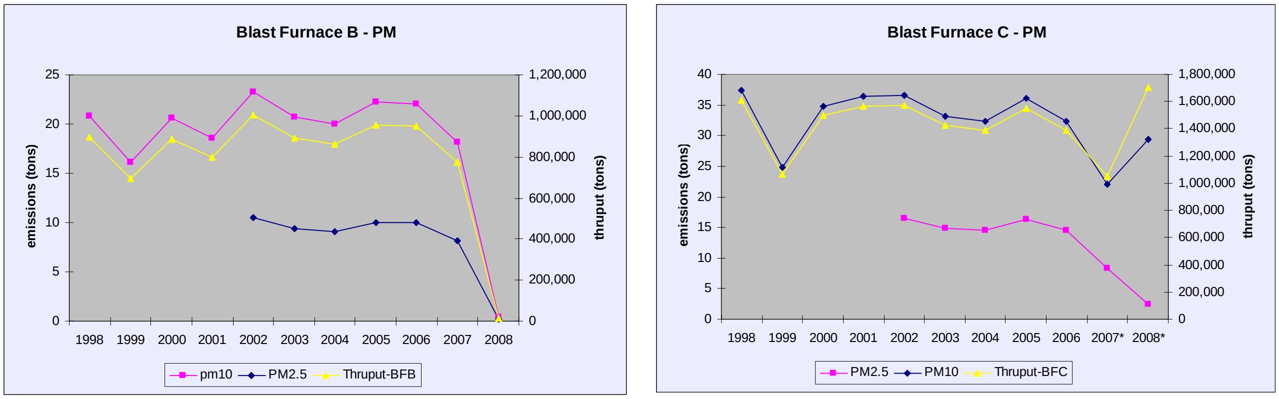
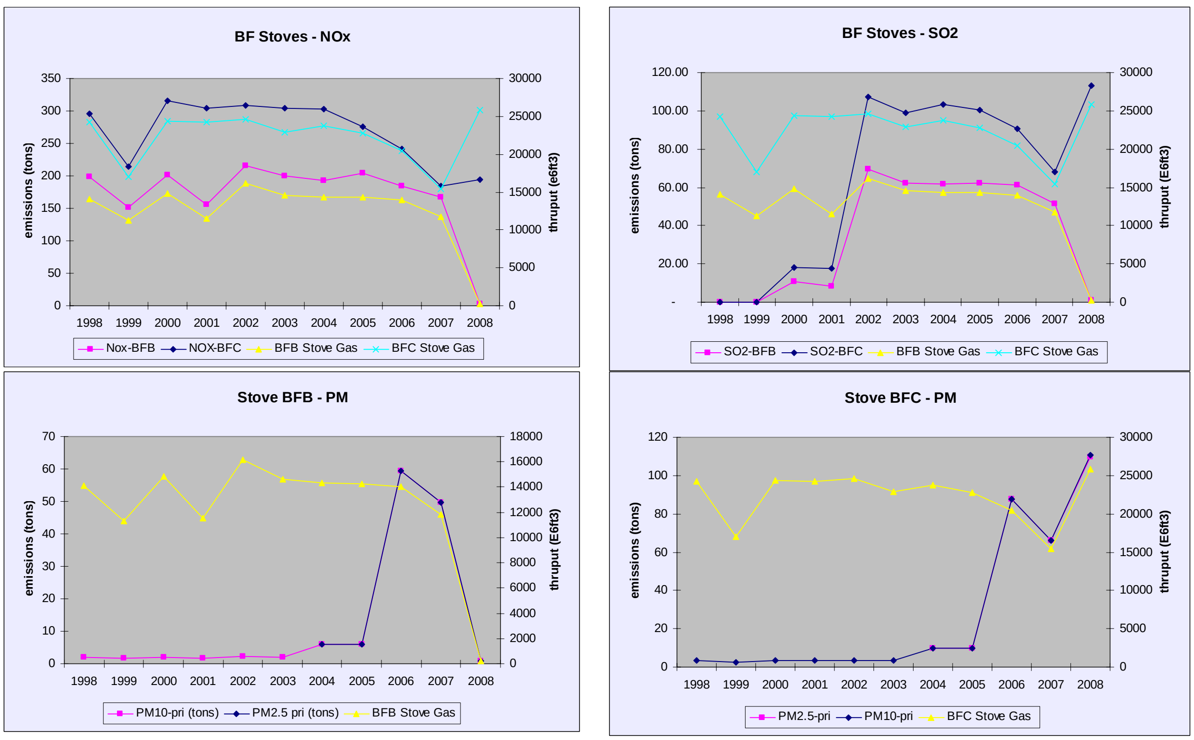


Figure 4. Blast Furnace Stove Emissions to Throughput Comparisons at Severstal



A different comparison can be made with throughput compared to ambient $PM_{2.5}$. For Severstal, this comparison does show some correlation. In 2007, baghouse controls for the BOF and blast furnace C were added. In January 2008, blast furnace B was severely damaged; requiring shut down and has not been repaired. The company indicated that when the blast furnace B does start up again, it will be controlled by a baghouse. In 2008 throughput began to increase for the BOF and Blast Furnace C, but ambient $PM_{2.5}$ decreased. This decrease in ambient $PM_{2.5}$ may be due to the blast furnace B shut down, as well as the impact of the new controls (see Figure 5 to Figure **7**).

Figure 5. BOF Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn Monitor

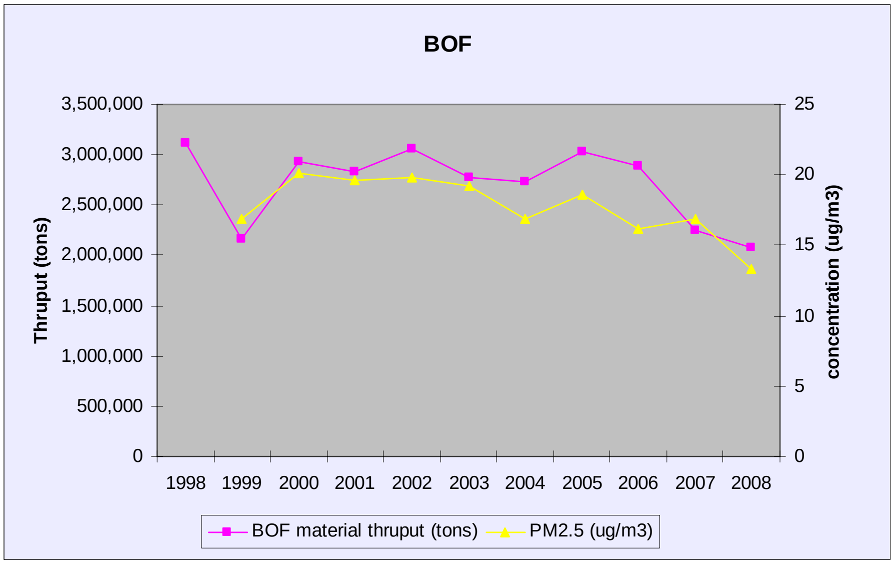


Figure 6. Blast Furnace Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn Monitor

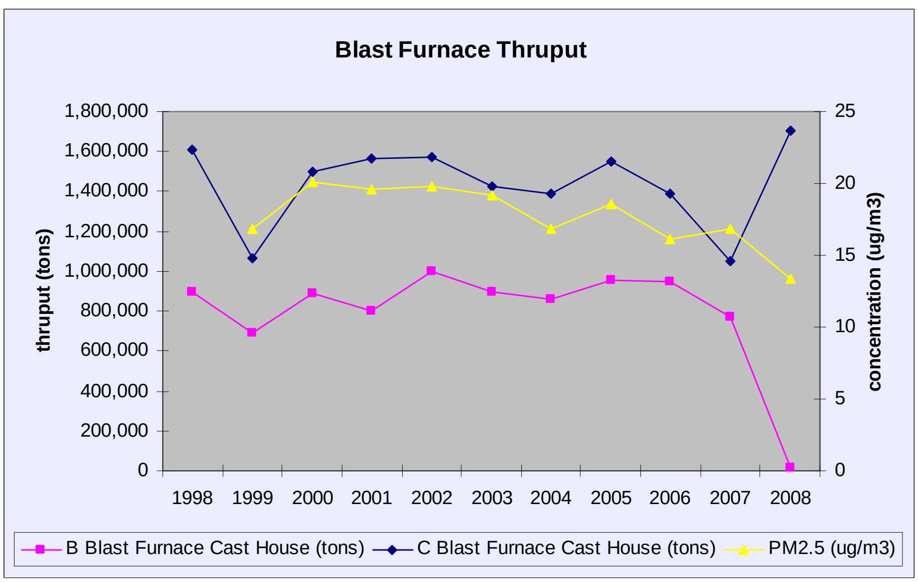
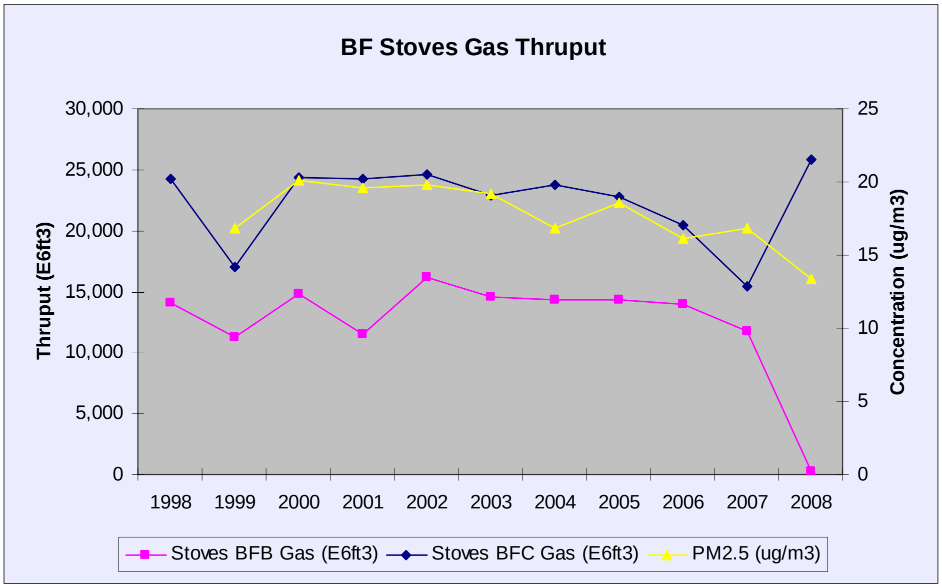


Figure 7. Blast Furnace Stoves Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn Monitor



Severstal, being a major emissions source located very near and directly upwind of the Dearborn monitor, is considered to directly impact $PM_{2.5}$ levels at the monitor. With the recent (2007) installation of additional PM controls to the steel mill, ambient $PM_{2.5}$ showed attainment for $PM_{2.5}$ NAAQS for the first time at the Dearborn monitor. A major reason can be explained by additional Severstal controls, and this source is a likely candidate for contingency measures if additional controls are needed in the Dearborn area.

U.S. Steel

United States Steel, Great Lakes Works operates an integrated steel mill that has been in operation since August 1930. It is located just south of the city of Detroit. The site consists of approximately 1100 acres that span along the Detroit River through the cities of Ecorse and River Rouge. The facility includes the Main Plant Area, the 80-inch Hot Strip Mill, and the iron making and coke-making operations on Zug Island. The plant produces flat-rolled steel products for the automotive, appliance, container, service center, and piping and tubing industries. It should be noted that the coke-making operations have been sold to another company.

The primary iron producing facility is located on Zug Island, in the city of River Rouge. Zug Island is bordered by the Rouge River on the north, south, and west sides and the Detroit River on the east side. The Zug Island facility includes three operating blast furnaces, one coke oven, coke by-product recovery plant, and three boiler houses. The facility site is zoned heavy industrial. The nearest residential area is approximately 0.6 mile from the facility. This portion of the facility is located 2.5 miles southeast of the Dearborn monitor.

The 80-inch Hot Strip Mill facility is located in the city of River Rouge between the Zug Island and Main Plant facility location. The 80-inch Hot Strip Mill facility includes the hot strip finishing and shipping building, scale pit, coil storage and shipping building, slab yard, and 80" hot strip mill. The facility site is zoned heavy industrial. The nearest residential area is approximately 1.5 miles from the facility.

The Main Plant Area is located on a 682-acre site located in the city of Ecorse. It is bordered by the Detroit River on the east, by the 80-inch Hot Mill Strip facility on the north, by the E.W. Levy Plant No. 5 on the south and Jefferson Avenue to the west. The following steel-making operations are located at the Main Plant: No. 2 Basic Oxygen Process (#2 BOP), Vacuum Degasser, Ladle Metallurgical Facility (LMF), Pickle Line, Electrogalvanizing Line, No. 4 tandem cold mill, Annealing Furnace, and Boiler House. The plant site is zoned heavy industrial. The nearest residential area is approximately 0.5 mile from the facility.

US Steel has several large emitting sources, and in some cases, the emissions do not follow throughput (see Figures 8 through 14). In particular, some units' emissions in 2004 and 2005 do not follow throughput (see Figure 8 through 12). Information is not available to explain these changes. Also, emission factors used are not reported for several years in the AQD MAERS program, so the reason for changes are difficult to track.

Figure 8. 80" Strip mill emissions to throughput comparison at US Steel.

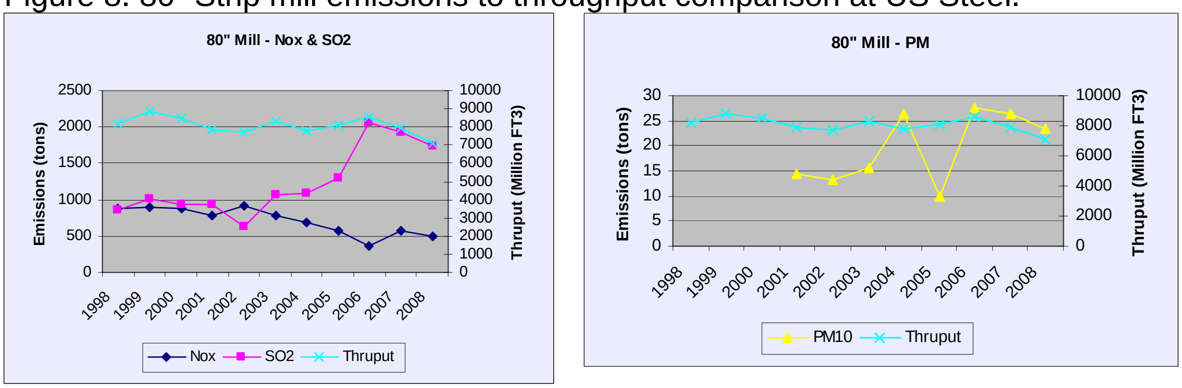


Figure 9. Blast furnaces B and D emissions to throughput comparison at US Steel.

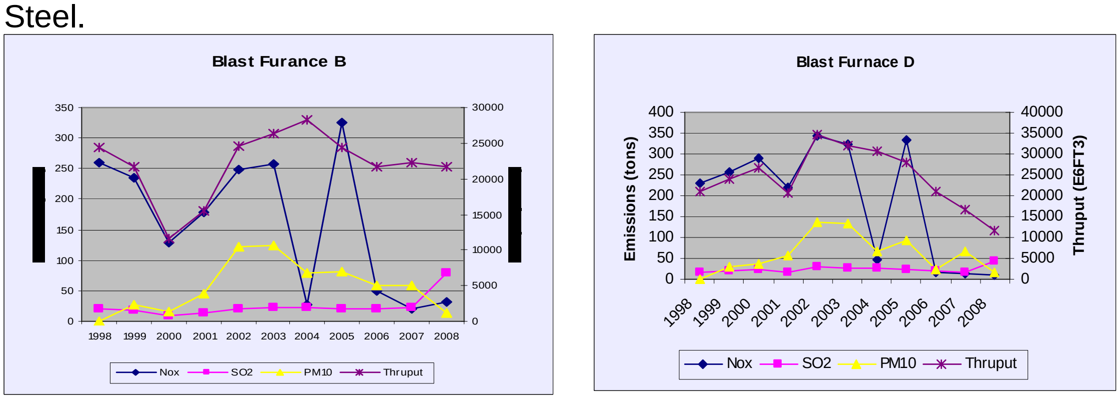


Figure 10. Coke oven emissions to throughput comparison at US Steel.

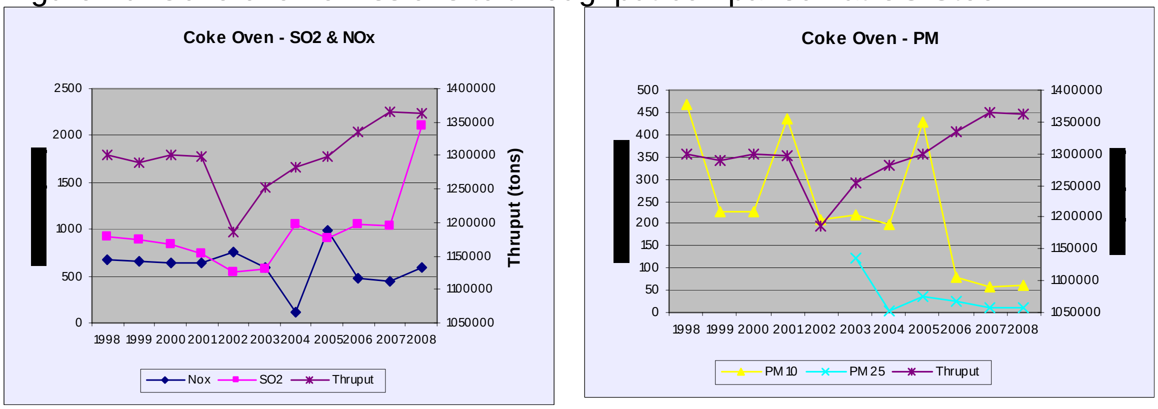


Figure 11. Coke oven gas flare emissions to throughput comparison at US Steel.

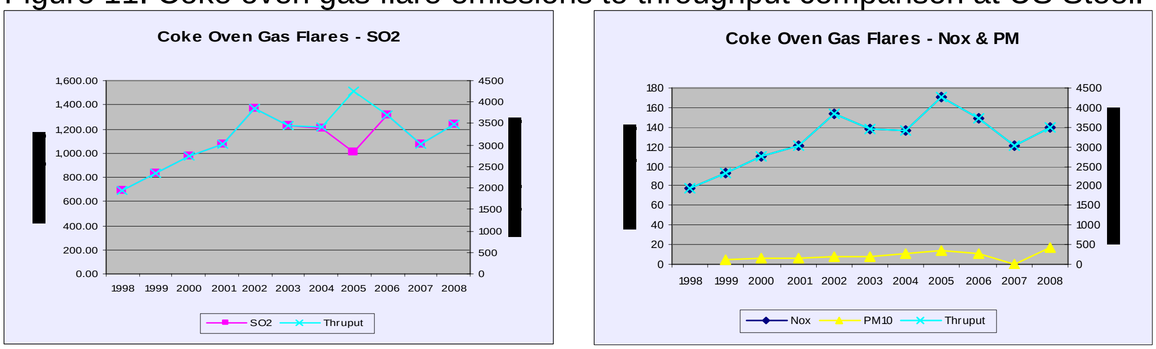


Figure 12. BOF emissions to throughput comparison at US Steel.

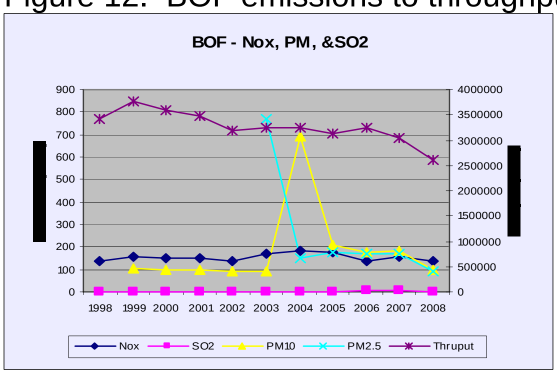
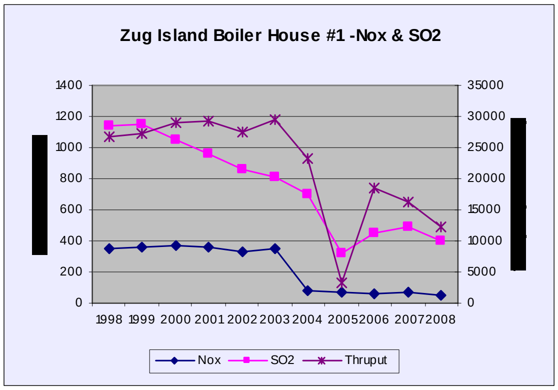


Figure 13. Zug Island boiler house #1 emissions to throughput comparison at US Steel.



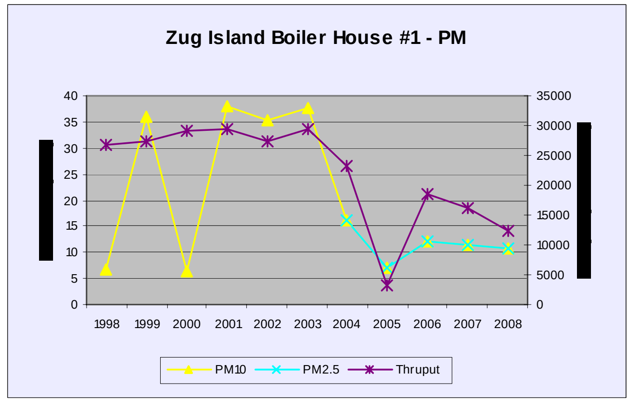
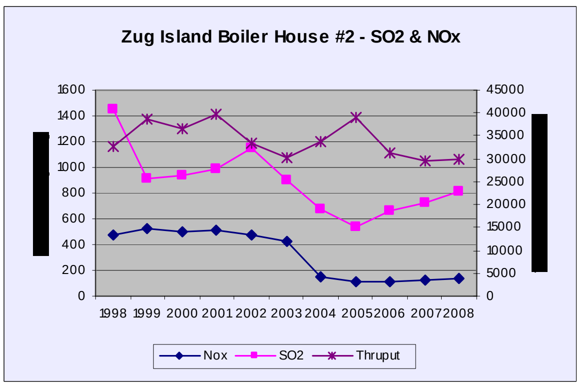
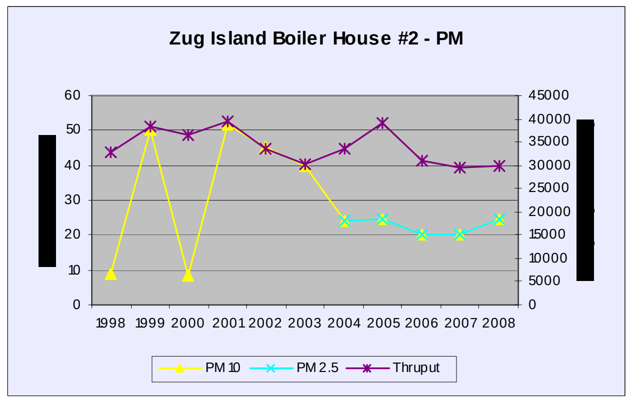


Figure 14. Zug Island boiler house #2 emissions to throughput comparison at US Steel.

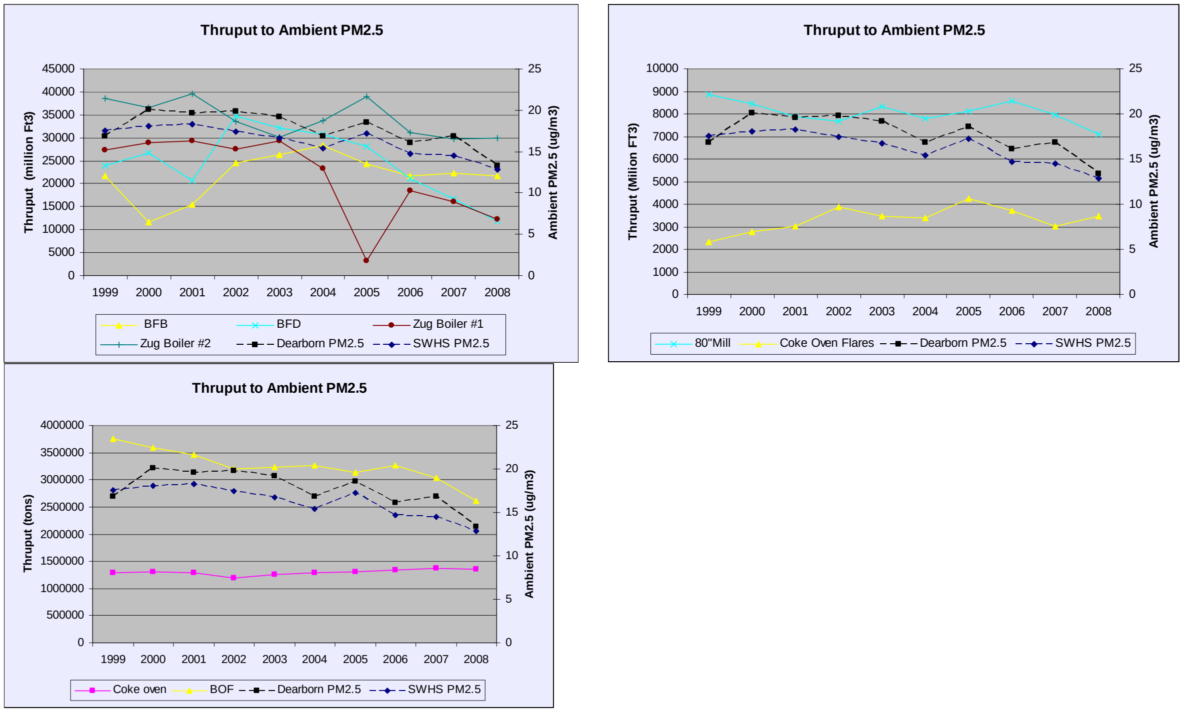




Since throughput does not follow emissions very well, another comparison was made. Throughput was compared to ambient $PM_{2.5}$ at the Dearborn monitor and at the Southwest High School (SWHS) monitor, since US Steel is much closer and upwind of the SWHS monitor. This comparison shows some correlation for some emission units, but not for others (see Figure 15).

It should be noted that while US Steel is a large emissions source, it may have less impact on the Dearborn monitor than other large sources in the area, since it is downwind of the monitor.

Figure 15. Throughput to Ambient $PM_{2.5}$ Concentrations at the Dearborn and SWHS Monitors.



Marathon-Ashland Petroleum LLC

Marathon Ashland Petroleum LLC. – Detroit Refinery and Detroit Light Products Terminal are located at 1300 Fort Street and 12700 Toronto Street in the southwest part of the city of Detroit. The facilities are sited between Interstate Highway I-75, Fort Street, Oakwood Avenue and Dix Avenue and the Rouge River. The nearest residential area is approximately 100 feet west of Stocker Avenue near the Rouge River Terminal. Marathon is located two miles south of the Dearborn monitor. The refinery operates 24 hours per day, seven days per week and 52 weeks per year.

Marathon Ashland Petroleum LLC refinery processes approximately 72,000 barrels per day of crude oil, which is refined into a product mix of liquefied petroleum gases, gasoline, fuel oil, asphalt, and other products. The makeup of this production will vary depending on the type of crude used as charge stocks. The finished products leave the facility via truck, lake tanker, railroad car, or pipeline.

The refinery is organized into five complexes for operations and maintenance purposes. Complex I has the Crude and Vacuum Units. Complex II consists of the Unifiner, Alkylation, and Sulfur Recovery units. Complex III includes the Fluid Catalytic Cracking Unit (FCCU) and other Light Ends Units. Complex IV includes the Catalytic Reformers, Hydrotreaters, and Boilers; and Complex V contains the

Storage and Blending Facilities, as well as the Marine Loading Facilities. The refinery operations are controlled by a Distributed Control Computer System.

Crude oil is the raw material the refinery utilizes to create finished products such as fuels and asphalt. The refinery is staged such that processing alters the physical and chemical state of the crude oil, which in turn, produces marketable products. Both sweet and sour crude oils are processed at the Detroit refinery. Sour crude contains a higher content of sulfur components than sweet crude. All crude oil is pipelined into the refinery. Other raw material may be brought into the refinery by pipeline or is transported in trucks including iso-butane, n-butane, toluene, xylene, ethanol, gas oil and catalysts.

Reviewing the company's emission inventory and throughput data from 1998 through 2008 indicated that the facility's operations had actually increased for the years 2006 through 2008; i.e., the same time period as the decreased emissions shown on the Dearborn monitor. Marathon reported source emissions using the emissions factors within MAERs. The material and fossil fuel throughput amounts for the largest units at this location, the FCCU, Zurn Boiler and B&W Boiler were used to determine whether significant changes in operations had occurred. See Figure 16 through **Figure 19**. The graphs begin in the year 2003 and go through 2008. Prior to 2003 the operations at the facility were intermittent. Emissions for $PM_{2.5}$ were not reported, and back calculations of the emissions using the most current emission factor did not show anything significant.

The Detroit Heavy Oil Upgrade project (DHOUP) air permit (most recent permitting activity) has specific emission limits for the FCCU, Zurn Boiler and B&W Boiler, which are federally enforceable. In addition, the refinery purchased 80 tons of PM_{10} emission credits for offsetting purposes during the permitting for the DHOUP project. Per the facility and district staff contact, the credits were never used and were retired from use.

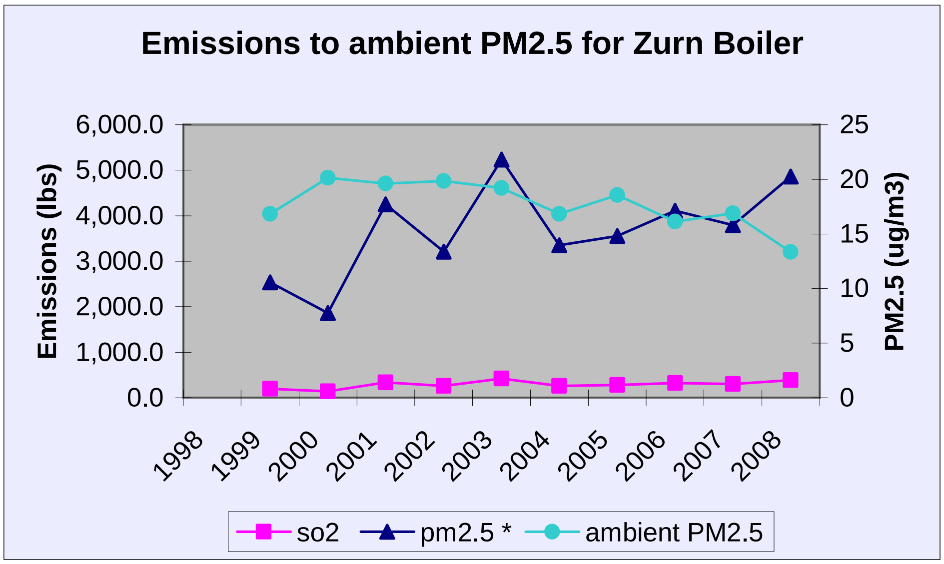
The offsets were purchased from Central Wayne Recovery and Carmeuse Lime. Central Wayne Recovery was located in Inkster MI, near Dearborn. The facility ceased all operations in the fall of 2003. Therefore the reductions are permanent.

Carmeuse Lime (formerly known as Detroit Lime) was located on Dix Road in Detroit near Dearborn. The facility ceased all operations in Fall 2002. Therefore the reductions are permanent.

<u>Zurn Boiler</u>
The Zurn Boiler's normal operations are year-round 24 hours a day. The exhaust stack for this unit is 150 feet high with an inside diameter of 72 inches. This unit is centrally located within the facility boundaries. The facility originally proposed removal of the Zurn boiler (at 210 mmbtu/hr) and replacing it with a new boiler

(rated at 300 mmbtu/hr). However, the facility determined that the extra steam generating capacity was not necessary and kept the Zurn boiler in operation. The Zurn boiler has the capacity to burn refinery fuel gas, but only uses natural gas at this time. The Zurn boiler has federally enforceable permitted emission limits for NOx, CO, VOC, PM and PM_{10}. The Zurn boiler also has a material throughput limit of 210,000 cubic feet per hour of fuel burned. The Zurn Boiler has a federally enforceable permit limit requiring installation and maintenance of multi-staged low-NOx burners. Figure 16 shows a comparison of emissions to ambient $PM_{2.5}$ at the Dearborn monitor.

Figure 16. Zurn Boiler Emissions to Ambient $PM_{2.5}$ at Dearborn Monitor



*$PM_{2.5}$ emissions calculated based on throughput.

FCCU

The FCCU's normal operations are year-round, 24 hours a day. The exhaust stack for this unit is 195 feet high with an inside diameter of 72 inches. This unit is centrally located within the facility boundaries. Per the company contact, the FCCU has had major control projects installed to help reduce PM from the unit. In December 2004, the refinery installed Electrostatic Precipitators on the exhaust portion of this stream to reduce PM below the federal limits. After they began using higher sulfur crude (tar sands?) they experienced an increase of PM rates in 2008. In late 2008, the facility installed an ammonia injection system to condition the gas plume on the unit to keep PM at conservative levels below the company's allowable limits. Overall the facility estimates that the ammonia injection system installation reduced NOx emission by 20 percent. Per the facility, they have reduced criteria pollutant emissions by 75 percent through the installation of state of the art technologies (see Figure 17 and Figure **18**).

Figure 17. Emissions to Throughput Comparison for the FCCU at Marathon

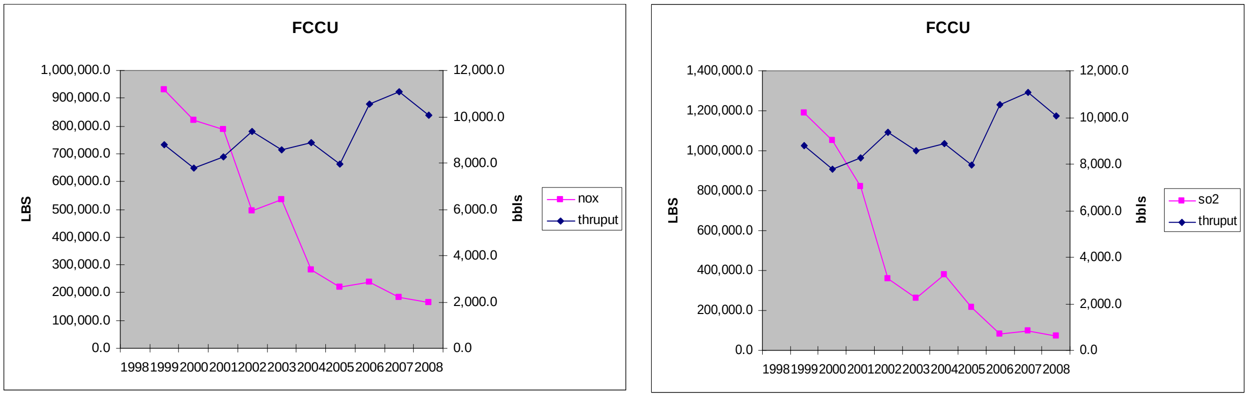
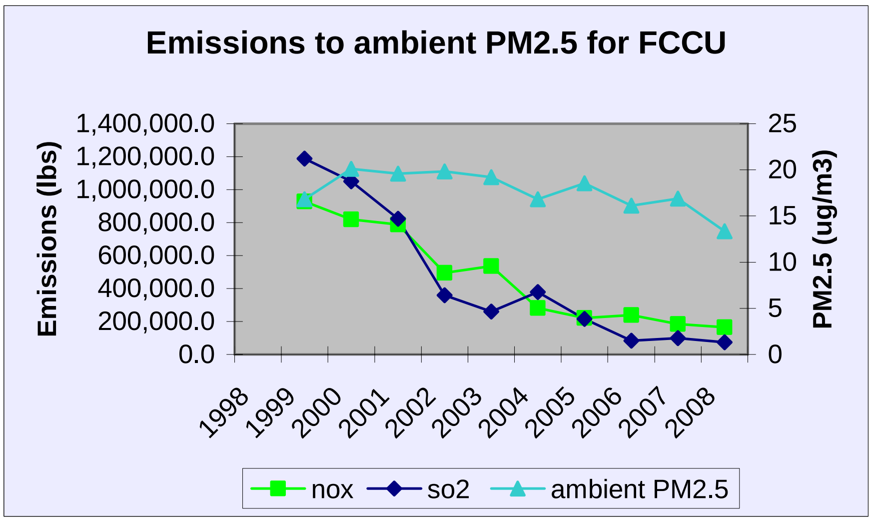


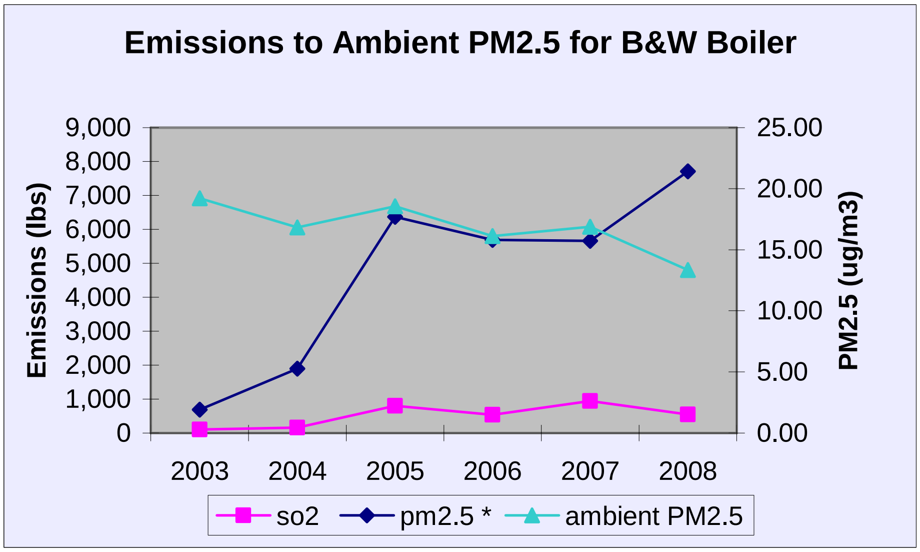
Figure 18. FCC Emissions to Ambient $PM_{2.5}$ at Dearborn Monitor



B&W Boiler

The B&W Boiler's normal operations are year-round, 24 hours a day. The exhaust stack for this unit is 150 feet high with an inside diameter of 80 inches. However, this unit is centrally located within the facility boundaries. The B&W boiler has federally enforceable permitted emission limits for NOx, CO, VOC, PM and PM_{10}. In addition, the unit has a SO_2 federally enforceable permit limit. The B&W boiler also has a federally enforceable material throughput limit of 300,000 cubic feet per hour of fuel burned. The boiler has a low NOx burner and flue gas recirculation control system. The B&W boiler burns natural and process gases (see Figure 19).

Figure 19. B&W Boiler Emissions for Marathon to Ambient $PM_{2.5}$ at Dearborn Monitor



*$PM_{2.5}$ emissions calculated based on throughput.

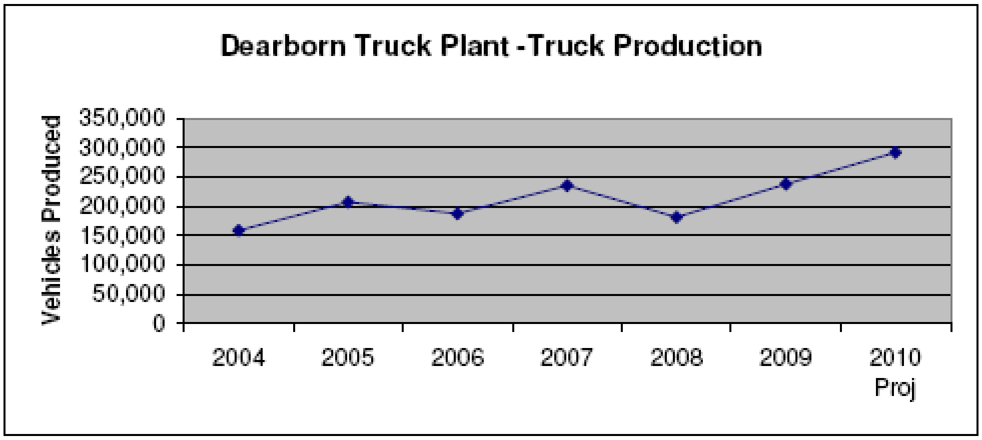
<u>Ford Motor Company-Rouge Complex</u>

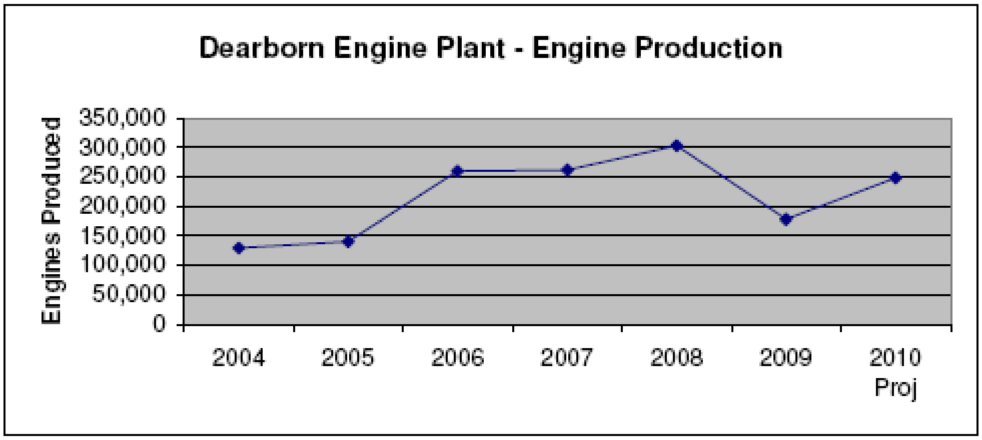
The Ford Motor Company Dearborn Assembly Plant is located on Miller Road in the city of Dearborn, part of the Rouge Industrial Complex. The facility is bounded by Rotunda Drive to the north, by Interstate 94 on the northwest, Schaefer Avenue to the west, the Rouge River to the south and Miller road to the east. It is located less than one mile west of the Dearborn monitor.

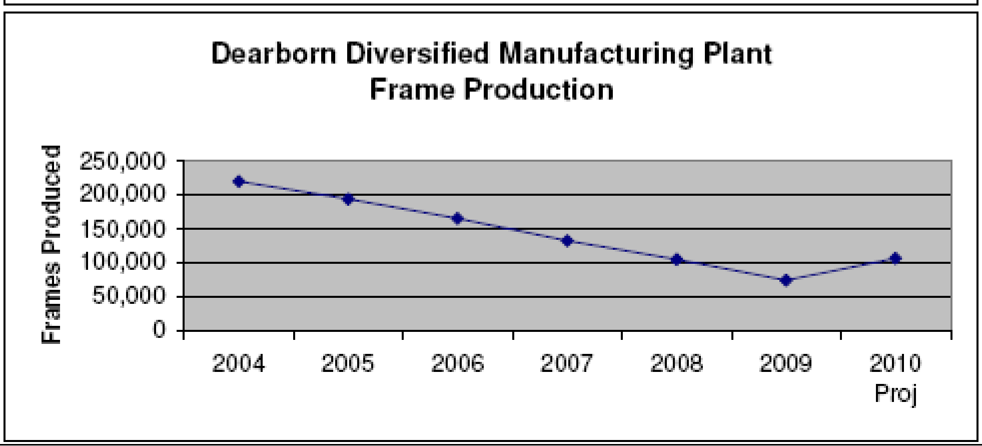
The Ford Dearborn Rouge Complex consists of four individual manufacturing plants that produce automobile and automobile components, as follows: an assembly plant that produces and paints vehicles, an engine and fuel tank manufacturing plant that produces automobile engines and metal fuel tanks, a stamping plant that stamps vehicle body panels and similar body parts for other vehicles, and a diversified manufacturing plant that electrocoats and manufactures vehicle frames.

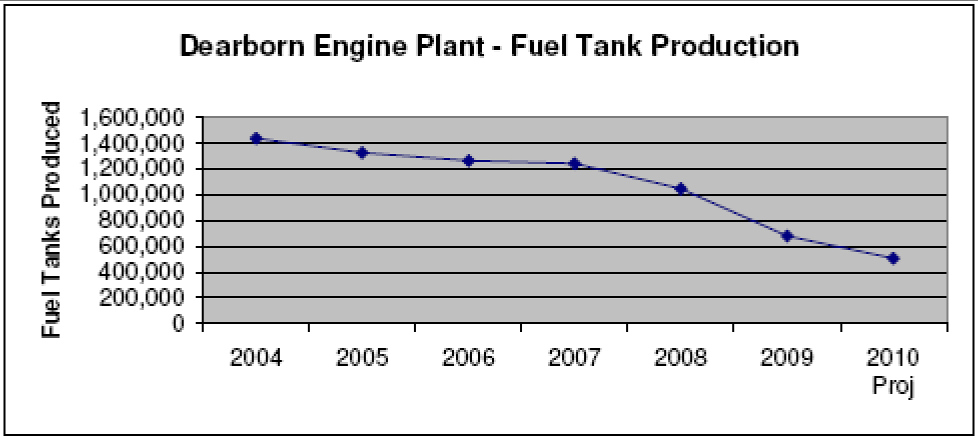
Ford operations at the Rouge complex have not experienced the economic downslide as have other Ford facilities. Series F-150 trucks are built in the complex and production levels have been relatively stable. See Figure 20 for production information for the four plants. Ford ceased foundry operations around 1981 in the closing of the Specialty Foundry. The steel-making operations located in the complex are currently owned by Severstal.

Figure 20: Productions for the Ford Rouge Complex.





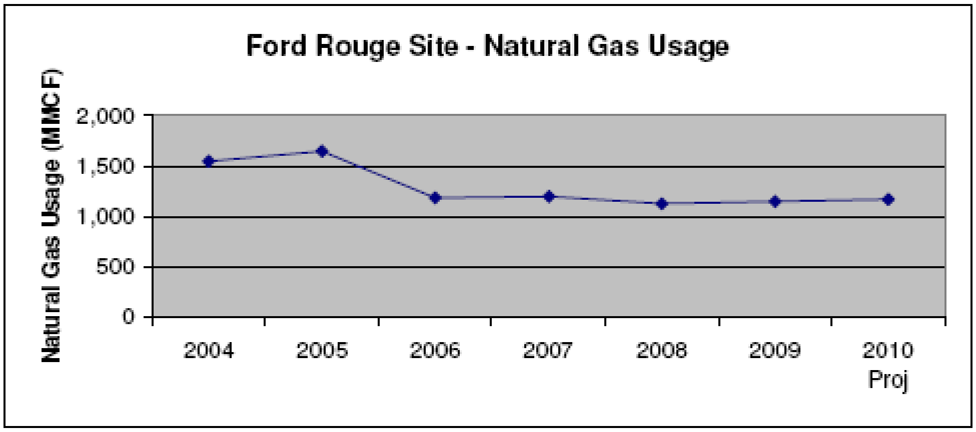




Several emissions were combined under the RG-Paint reporting group, which has natural gas usage reported. RG-Paint reports the total natural gas combustion for the Dearborn Truck Plant paint shop building. The natural gas usage includes the paint shop space heating, booth air supply houses, hot water boilers, coating curing ovens and air emission abatement equipment (thermal oxidizers and carbon adsorption systems). In addition, the EU-NATGASSPACE emission unit includes all the natural gas used for space heating at the Dearborn Truck Plant outside of the paint shop (i.e., - body and final assembly buildings). Several other EUs report natural gas usage as well. EU-HEATERSFRAME includes the natural gas used for space heating the Dearborn Diversified Manufacturing Plant (DDMP, formally known as the Dearborn Frame Plant). EU-ECOATFRAME includes the natural gas used in the DDMP Ecoat curing oven. EU-HEATERSENGINE includes the natural gas used for space heating the Dearborn Engine and Fuel Tank Plant.

The old Dearborn Assembly Plant ceased operations in May 2004. A portion of the building was demolished in 2004/2005. The remaining building was decommissioned and put into a cold idle status (natural gas line was blanked) after the heating season in 2005. Although there may have been other efficiency improvements, it appears the shutdown of the old Dearborn Assembly Plant was a significant portion of the decrease in natural gas usage (see Figure 21).

Figure 21: Ford Rouge Complex natural gas usage.



NOx emissions are generated from the combustion of natural gas (space heaters, air houses, ovens, thermal oxidizers) located at the Dearborn Truck Plant (paint and assembly), from natural gas combustion (space heaters and ovens) at the other manufacturing facilities and also from the gasoline combustion associated with engine dynamometer testing (EU-DYNOTEST) located at the Engine Plant. Generally any SOx and $PM_{2.5}$ emissions result from natural gas combustion and the gasoline combustion in the engine dynameters. In addition, there are $PM_{2.5}$ emissions generated from the painting, body scuffing and machining operations located at Ford manufacturing facilities at the Rouge Complex. In addition to the natural gas, diesel fuel is used for emergency generators and fire pumps, gasoline is used in the engine testing dynamometers and propane is used for the mobile hi-los.

There are three natural gas billing meters to account for all of the natural gas used by Severstal and Ford in the Rouge Complex. The facility indicates that the total natural gas usage allocated to the Ford facilities is a reasonable value. Building-specific usage rates are considered less reliable and provided to the company by Severstal for budgetary purposes. Similarly, the $PM_{2.5}$ due to natural gas combustion will be less reliable on a building by building basis.

Dearborn Industrial Generation (DIG) began providing steam to the facilities at the complex around August 2001. At that time, the temporary 250-MMBTU boilers, in use since the summer of 1999 as interim replacement for the Rouge Powerhouse, were idled in advance of being shutdown and removed.

The facility fugitive dust plan indicates several areas are swept, flushed or treated to keep dust to a minimum. There are two road vacuum/sweepers. These two road sweepers are cleaned daily and sent to the mechanic shop for routine maintenance (grease, inspection, etc.) on a weekly basis. A consent order mentions bulk materials to address road salt stored in a dome and used to melt snow during the winter season and to address the occasional constructionrelated debris when temporarily stored on site while awaiting proper waste characterization just prior to being hauled offsite. At this time, the road salt is stored in a dome. There is no need for other enclosures as there are no other permanent material stockpiles. The newest Ford facilities in the Rouge Complex are those buildings associated with the Dearborn Truck Plant. The Paint shop became operational in late 2001. Operations in the new final assembly and body shop buildings began during 2004, replacing the former Dearborn Assembly Plant operations.

Ford's Installation of the green roof on the Dearborn Truck Plant Final Assembly building was completed in June 2003. There are no reports estimating any air emission reductions associated with the green roof. There have been some storm water benefits from the green roof. The MDEQ believes that the installation of a green roof (while not documented) impacts the reduction of NOx and possibly $PM_{2.5}$ within the immediate area.

Ford is upwind of the Dearborn monitor; however, its throughput does not correspond well with the ambient $PM_{2.5}$ trends. The major emissions from Ford are VOCs (430 tons per year), which the MDEQ is not analyzing for controls in this SIP. Other pollutants such as NOx (>50 tons per year) and PM (>10 tons per year) are not as large as other facilities in the area, and therefore may have less affect on ambient $PM_{2.5}$ in the Dearborn area.

Dearborn Industrial Generation

Dearborn Industrial Generation (DIG) is located directly east of Severstal Steel, less than one-quarter mile from the Dearborn monitor. DIG is a cogeneration unit that uses blast furnace gas from Severstal to produce electricity and also provides steam back to Severstal for their processes. The facility consists of three natural gas fired combustion turbines (one installed 1999, other two in 2001), three natural gas (NG) and blast furnace gas (BFG) fired boilers (all installed 2001), and two diesel fuel oil fired emergency generators (installed 2003). Two existing flares (previously owned and operated by Rouge/Severstal Steel Company and now owned by DIG, one installed 1936 other in 1999) burn blast furnace gas if it cannot be utilized in the boilers. All three of the boilers are designed to fire a mixture of up to 95 percent BFG and five percent NG (by heat input) or 100 percent NG. The BFG is received from Severstal Steel as a byproduct of their iron and steel-making operations.

The plant runs year around and use for each unit varies by quarter and year. There is no regular pattern of usage. The flares, boilers and all but one combustion turbine have stacks over 150 feet high. The one combustion turbine has a shorter stack at 60 feet.

Emissions appear to mirror throughput in most cases (see Figure 22 through Figure **24)**. Emissions are determined by parametric emission monitors (PEMs), CEMs, stack tests or other. MAERS factors are rarely used to determine emissions. Boiler #2 for PM_{10} has lower emissions compared to throughput than the other boilers (see Figure 22). These numbers are based on stack test emissions. The NOx emissions for the boilers do not follow the throughput. These emissions are combined for natural gas and process gas usage. NOx emissions appear to decrease as process gas throughput increases. Therefore emissions to throughput will not correlate as well as other pollutants. These NOx emissions are based on CEMs or PEMs.

Turbine #3 has lower emissions for PM10 compared to throughput than the other turbines (see Figure 23). All three turbines are equipped with low NOx burners. The emissions are based on stack test emissions.

Figure 22. SO_2, PM_{10} and NOx for Boilers at DIG

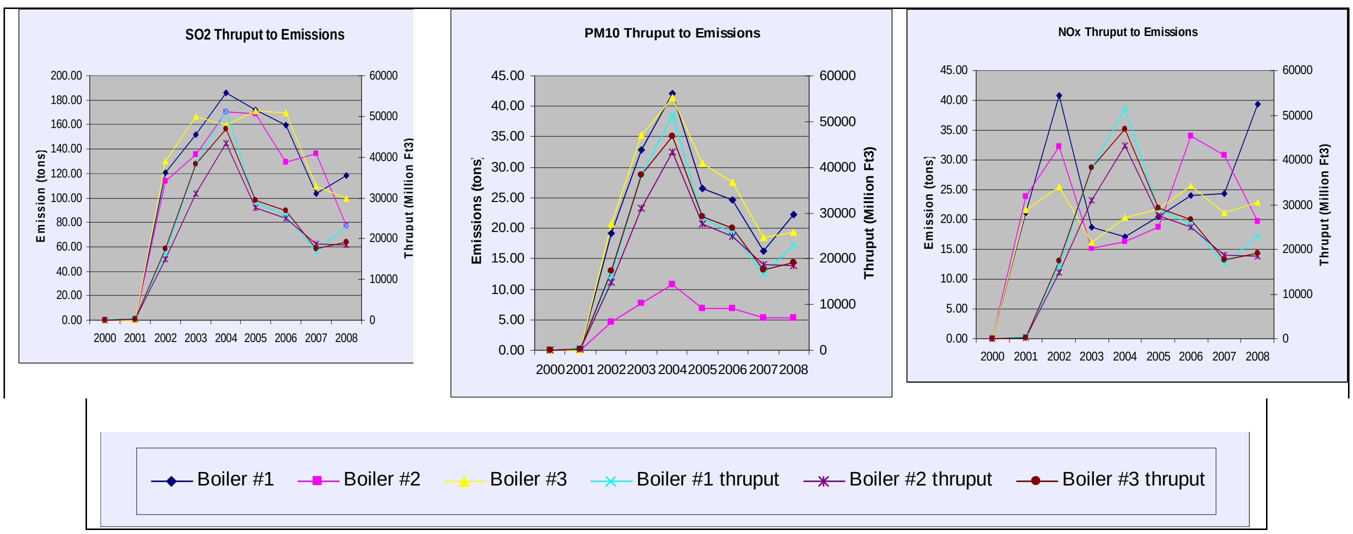


Figure 23. PM_{10} and NOx for Turbines at DIG

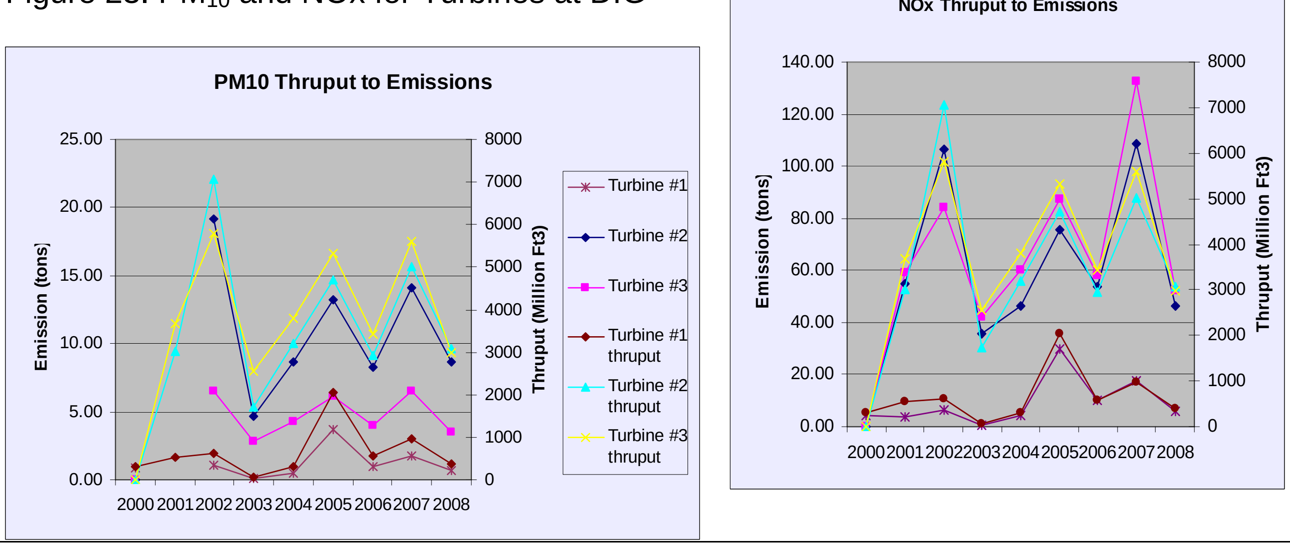
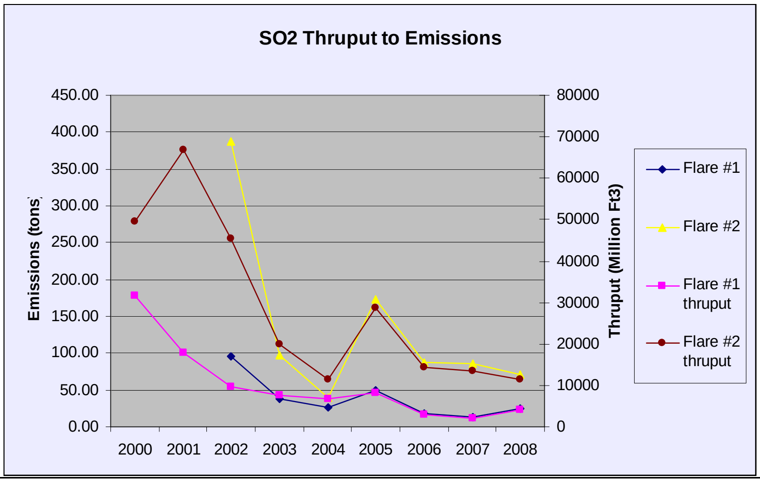
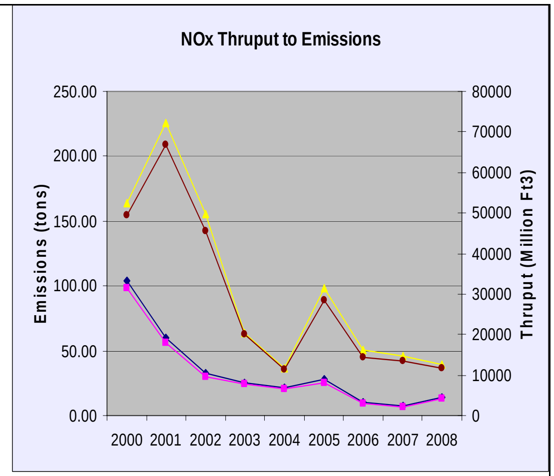


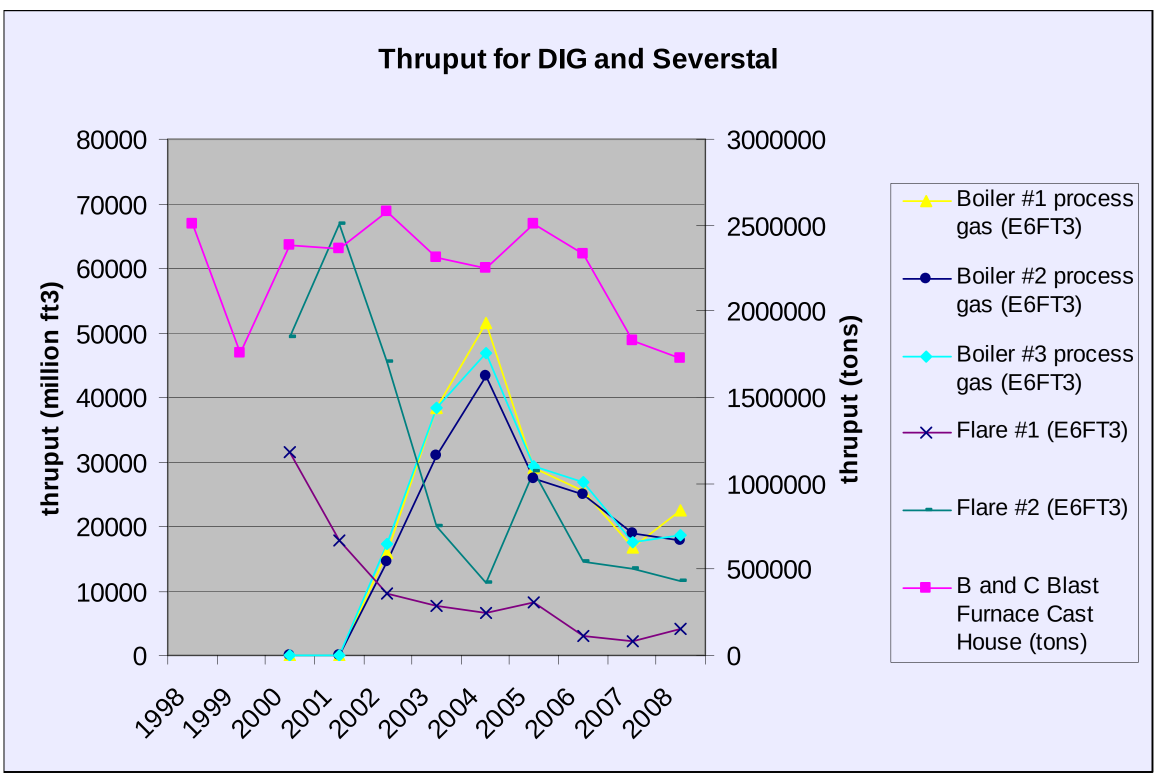
Figure 24. SO_2 and NOx for Flares at DIG





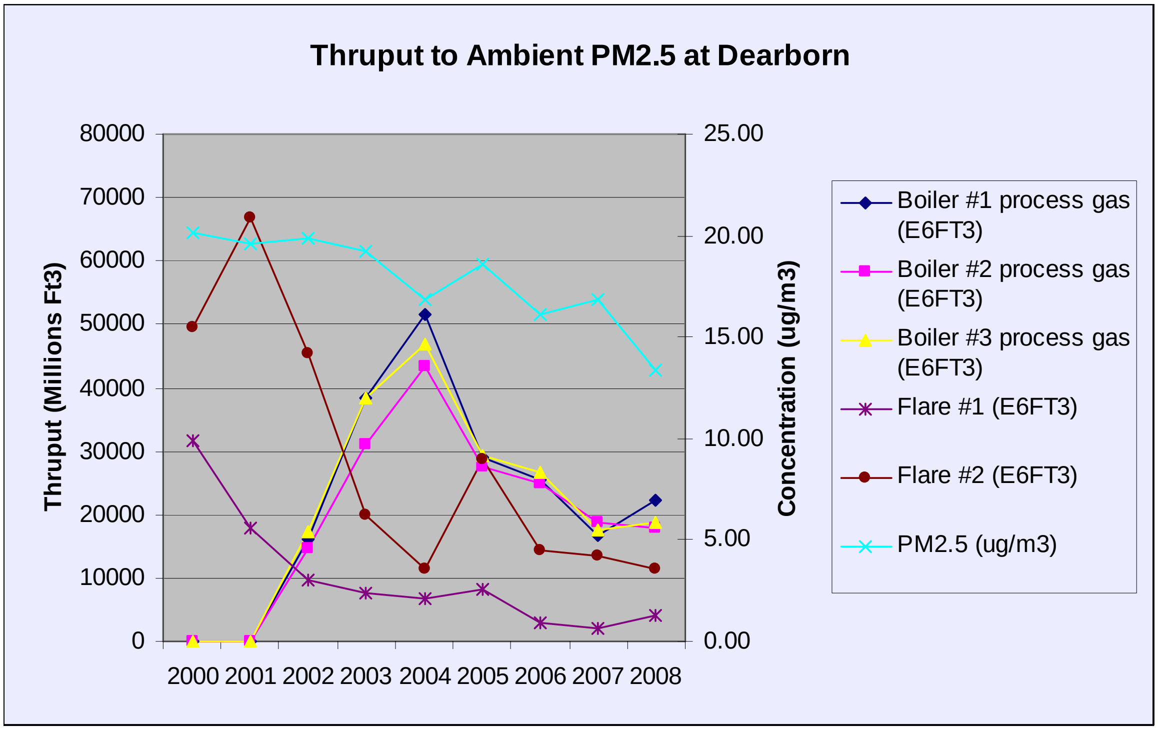
Throughput for the boilers and flares at DIG was compared to throughput at the blast furnaces at Severstal (see Figure 25). For the initial year (2001-2004) the throughput does not align; however, for 2005-2008, throughput correlates for DIG and Severstal. The boilers and one flare were built in 2001. Since they were just starting up, they likely were not in full use until around 2005 where they start to correlate with Severstal's emissions.

Figure 25. Throughput Comparing DIG to Severstal



Ambient $PM_{2.5}$ at Dearborn is decreasing similar to emissions at DIG after 2005, but earlier years do not correspond to $PM_{2.5}$ ambient concentrations (see Figure 26).

Figure 26. Throughput to ambient $PM_{2.5}$ for DIG



Cadillac Asphalt Products Corporation

The Cadillac Asphalt Products Corporation Plant 5A hot mix asphalt facility is located at 670 S. Dix Avenue, Detroit, Michigan. The location is about one half mile south of the Ford Rouge Complex and 1.5 miles south-southwest of the Dearborn monitor.

The facility operates a 525 tons-per-hour parallel flow hot mix asphalt (HMA) process. During a permit modification in 1999, the plant was limited to the use of natural gas and No. 2 fuel oil (where previously it had been allowed to use recycled oils). The maximum allowed production at the facility, based on a 12-month rolling period, is 940,000 tons per year, with a maximum hourly capacity of 525 tons per hour of HMA. The HMA production season in Michigan usually occurs early April through November, depending on weather conditions.

Figure 27 and 28 indicate an increase in the natural gas throughput for 2003 and a significant decrease for asphalt throughputs for 2006 (which can be attributed to the beginning of the economic decline in Michigan). Other than 2006, the asphalt operations were fairly steady. This could imply that emissions from the facility are not reflected in the decreasing $PM_{2.5}$ levels at the Dearborn monitor.

Figure 27. Throughput of Natural Gas in Asphalt Heater

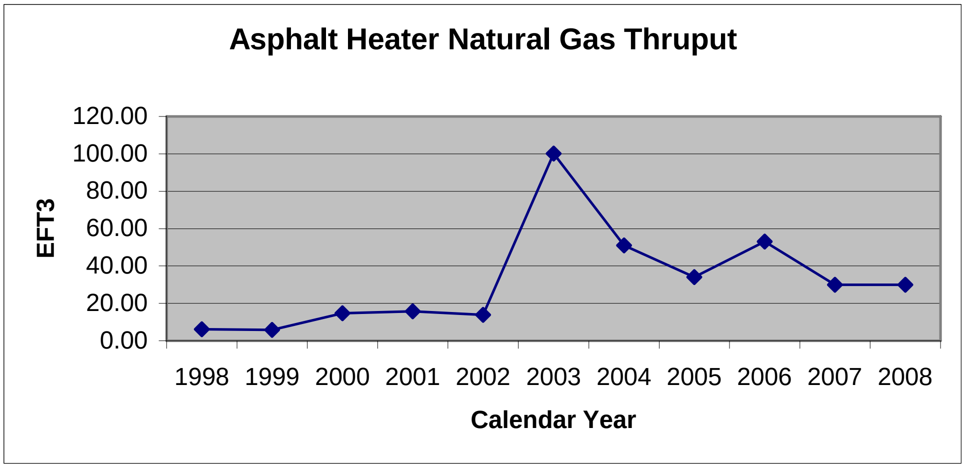
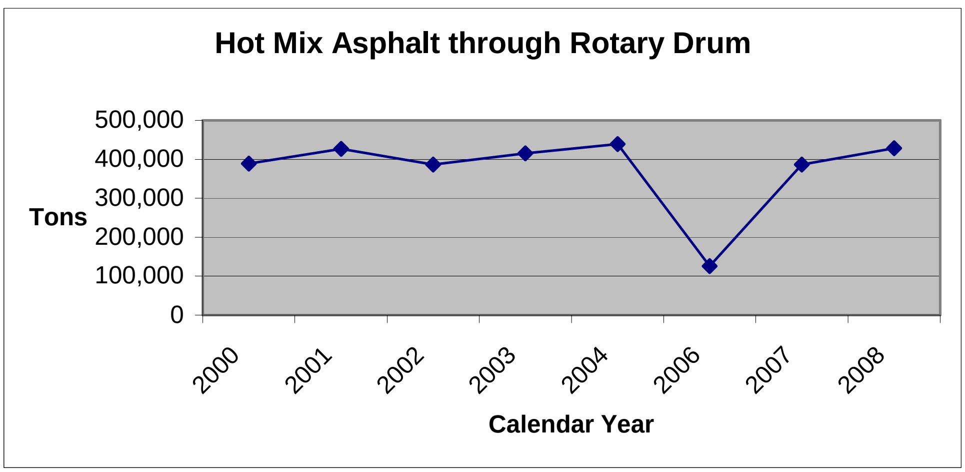


Figure 28. Throughput of Hot Mix Asphalt Through Rotary Drum



US Gypsum

The US Gypsum plant is located 2.5 miles southeast of the Dearborn monitor in River Rouge. This plant emits 50 tons or less of NOx and 100 tons or less of PM.

Ninety percent of the plant's production is gypsum wallboard. US Gypsum Company's exclusive registered trade name for its gypsum wallboard is Sheetrock. The plant also manufactures cement board, which is used as backing for tiled walls, such as bathrooms.

The primary raw material used is gypsum, or calcium sulfate, which forms airborne particulate air pollution during the manufacturing process. The plant has a large number of baghouse type dust collectors to control these emissions.

US Gypsum has one stack for its mill rock dryer that is 122 feet tall. A second baghouse stack that is discharged inside a building is only 25 feet tall. US Gypsum operates year around, generally 4 to 6 days per week.

Emissions reported in MAERS are based on MAERS emission factors or other factors. The NOx emissions and some PM emissions appear to closely follow the throughput values (see Figure 29 and Figure **30**). The emissions do not correlate well with the ambient $PM_{2.5}$ (see Figure 31). US Gypsum does mostly grinding of materials and does not incinerate, therefore, most of it emissions are likely in the PM_{10} fraction rather than the $PM_{2.5}$ fraction.

Figure 29. NOx Emissions to Throughput Comparison for US Gypsum

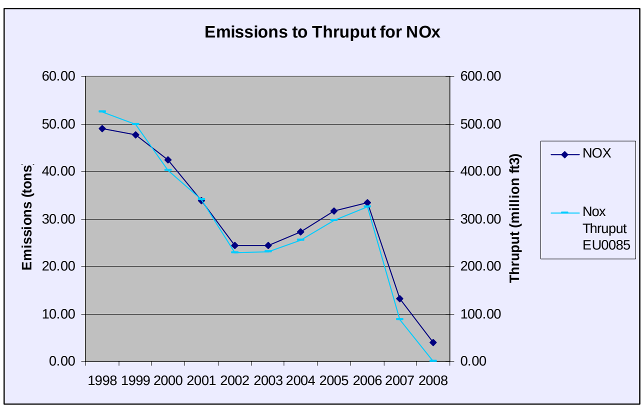


Figure 30. PM_{10} Emissions to Throughput Comparison for US Gypsum

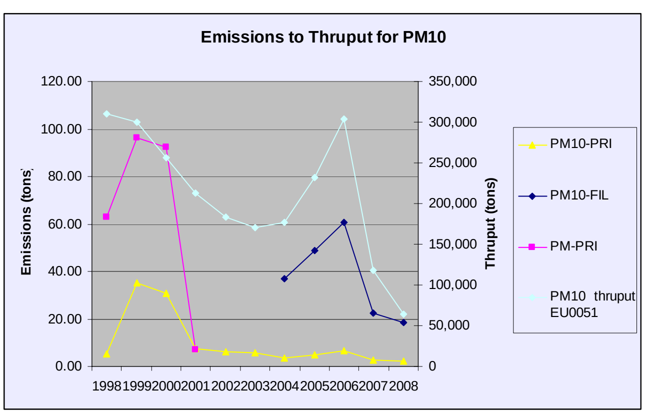
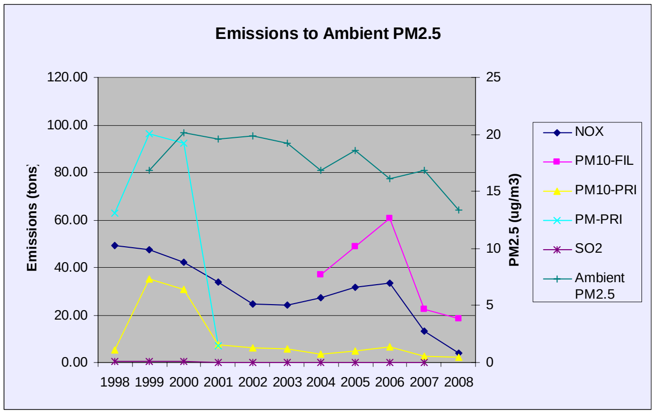


Figure 31. Emissions to Ambient $PM_{2.5}$ Concentrations for US Gypsum



Carmeuse Lime/River Rouge

Carmeuse Lime in River Rouge is approximately 2.5 miles southeast from the Dearborn monitor. Another lime plant, Carmeuse/Detroit Lime was less than a mile from the Dearborn monitor; however, that plant closed down in 2003.

Carmeuse Lime/River Rouge produces lime by the calcination of limestone. Limestone is calcinated in two horizontal rotary kilns. Limestone from the storage pile is transferred to the kilns through transfer stations and conveyors. The facility has two rotary kilns that may be operated simultaneously. The kilns are fired using pulverized coal and natural gas. The gases from the kilns are exhausted through two baghouses.

Three baghouses collect emissions generated by the handling of lime (loadout and rescreen). Flue dust from the kilns is pneumatically conveyed to the flue dust tank where it is stored and loaded into trucks. The flue dust tank and loadout spout are controlled by a dust collector.

Carmeuse Lime/River Rouge is a major emitter of NOx, SO_2 and PM. Carmeuse has two baghouse stacks about 70 feet tall. This plant operates year around and uses mostly MAERS emission factors. The emissions generally follow the throughput of lime (see Figure 32). The emissions do not correlate well to the ambient data at Dearborn. This may be partially explained by the facility distance and direction from the Dearborn monitor (see Figure 33).

Figure 32. Emissions to Throughput Comparison for Carmeuse Lime/River Rouge

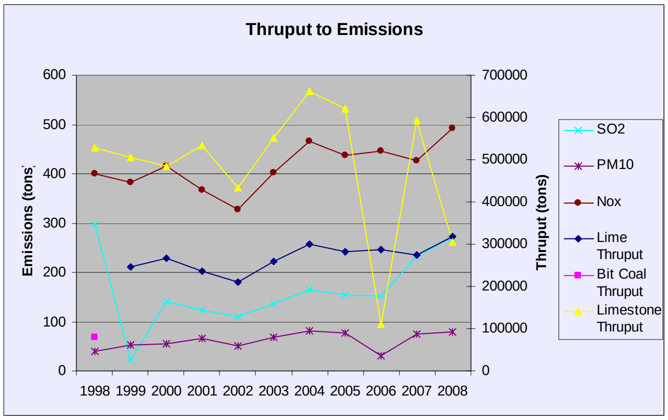
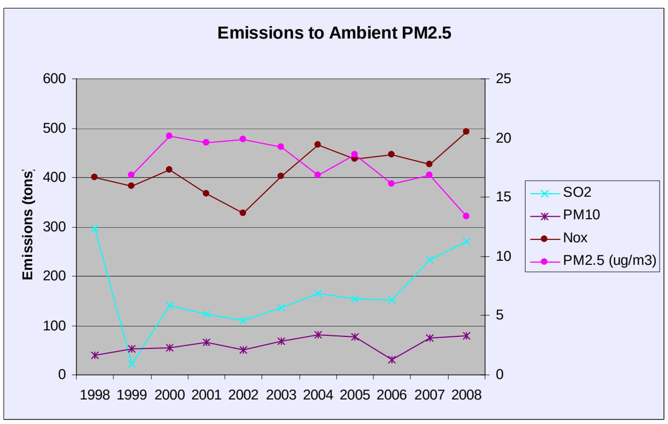


Figure 33. Emissions to Ambient $PM_{2.5}$ Concentrations for Carmeuse Lime/River Rouge



<u>Detroit Wastewater Treatment Plant</u>

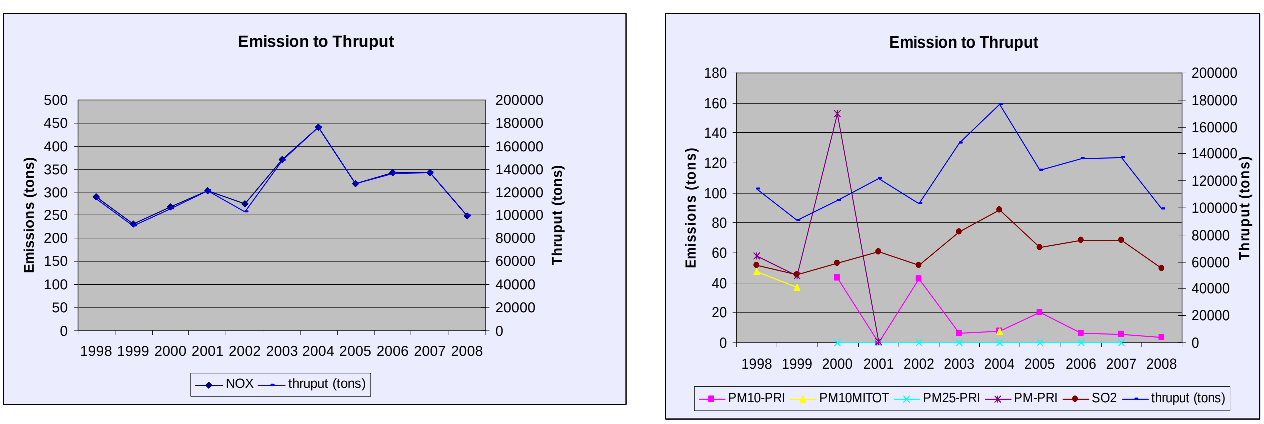
The Detroit Wastewater Treatment Plant is located two miles southeast of the Dearborn monitor. The wastewater treatment plant collects and treats domestic and industrial wastewater from the Metro Detroit area. The treatment capacity of the plant is about two billion gallons per day. The treated wastewater is discharged to the Detroit River. The treatment involves removal of large solids using bar racks and grit chambers, primary and secondary biological treatment for the removal of suspended and dissolved solids, clarification, chlorination of water from secondary clarifiers, sludge dewatering, sludge incineration and ash disposal to a sanitary landfill. The treatment processes are significant sources of volatile organic compound emissions; however, the incineration of sludge from filtration is the major source of NOx, SO_2, and PM.

The facility has 14 sludge incinerators controlled by venturi and impingement tray scrubbers. The complex I incinerators (incinerators 1 through 6) were constructed in 1940. The Installation permit (No. C-6657) covers Tall Stack #1 (254 ft tall) for Complex I Sewage Sludge Incinerator System serving Incinerators 1 through 6. The complex II incinerators were constructed in 1970 and are covered by installation permits C-6649 through C-6656 for incinerators 7 through 14 respectively. Installation permit (No. C-6658) covers Tall Stack #II (254 ft tall) for complex II sewage sludge incinerator system serving incinerators 7 through 10. Installation permit (No. C-6659) covers Tall Stack III (254 ft tall)for complex II sludge incinerator system serving incinerators 11 through 14. Each incinerator has a flue (stack). These flues are enclosed within three tall stacks. The six flues for the incinerators Number 1-6 are enclosed in Tall Stack #1, flues for incinerators 7-10 are enclosed in the Tall Stack II and flues for incinerators 11-14 are enclosed in Tall Stack #III. For an observer, only three stacks are visible.

Installation permits (No. C-6628 and C-6629) cover Sludge Mixer #1(East) and Sludge Mixer #1(West) respectively. The sludge/lime mixing area is also covered by the installation permit (No. C-6629). Because sludge mixers are situated inside the lime pad area, EGLIMEPAD and the sludge mixers (EGSLUDGEMIXER1 and EGSLUDGEMIXER2) are combined into one emission unit. Installation permits (No. C-6630 through C-6635) cover Lime Storage Silos 1 through 6, which are controlled by a fabric filter baghouse. The sludge mixing facility is controlled by a fabric filter baghouse. Complex I and Complex II ash handling systems are controlled by fabric filters.

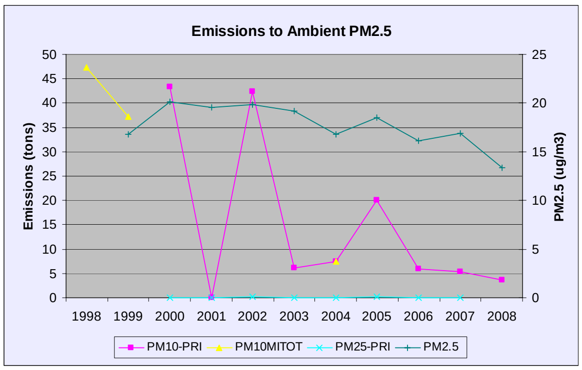
The plant runs year around. Emissions are calculated using MAERS emission factors (see Figure 34) according to the MAERS inventory. While the SO_2 and NOx correlate with the throughput, the PM does not. In 2005, MAERS emissions factors were reported to be used, but control efficiencies were added.

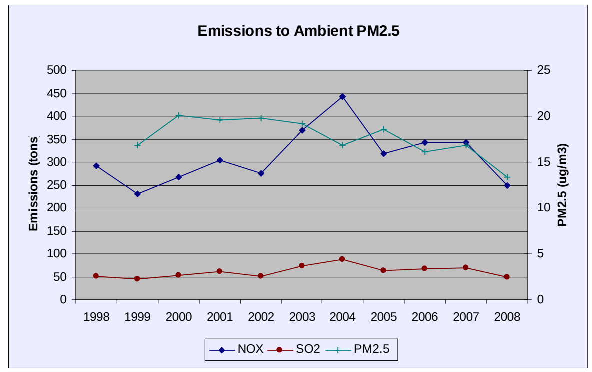
Figure 34. Emissions to Throughput Comparison for DWTP



Emissions to ambient data do not correlate well except for the later 3 to 4 years (see Figure 35). In general, this source's location and controls may partially explain this. The plant has multiple controls for their incinerators, such as demisters, impingement plate scrubbers and venturi scrubbers that control 90-99 percent of PM emissions.

Figure 35. Emissions to Ambient $PM_{2.5}$ Concentrations for DWTP





St. Mary's Cement

St. Mary's is a cement processing plant about 1.5 miles southeast of the Dearborn monitor. The plant has less than 10 tons per year emissions of NOx and SO_2, and around 25-35 tons of PM_{10} per year. PM emissions are mainly from their grinding mills that have bag house control with 99.9 percent control efficiency of PM_{10}. There are no emissions stacks indicated in MAERS and the majority of their activity occurs in the warmer months. The emissions do not match the throughput (see Figure 36) probably because the emission factors for PM have changed. Also, MAERS indicates the method used as "other," but no other indication of how the emission factor is calculated is shown in MAERS. The emissions do not match the ambient $PM_{2.5}$ (see Figure 37) although there is a slight trend downward for the last four years for both emissions and ambient data. The emissions from this source are not from combustion, but rather grinding, therefore, the size fraction will likely be greater than $PM_{2.5}$, more in the PM_{10} size range. This source is not likely to affect the ambient $PM_{2.5}$ in the Dearborn area for this reason.

Figure 36. Emissions to Throughput Comparison for St. Mary's

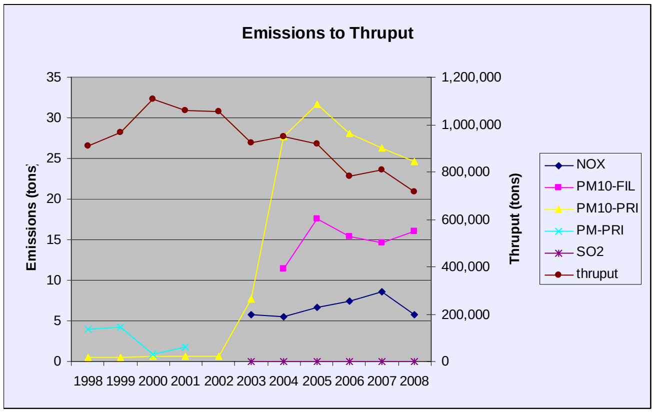
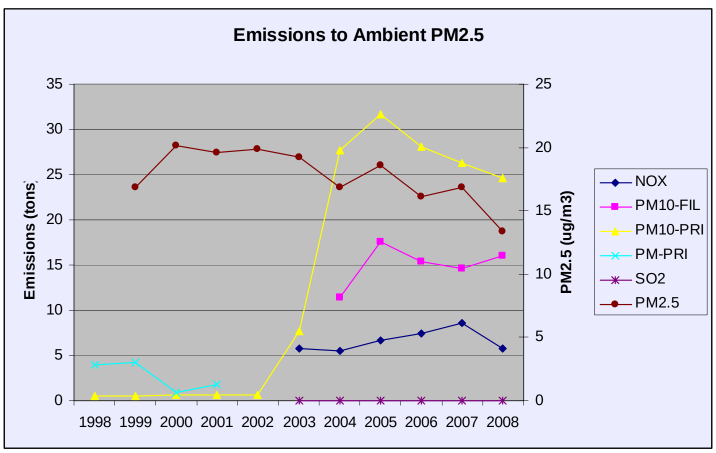


Figure 37. Emissions to Ambient $PM_{2.5}$ Concentrations for St. Mary's



Edward C. Levy Co Plant 1

This company crushes and screens slag. It is located approximately one mile northeast of the Dearborn monitor. Most of their emissions are from hauling on paved and unpaved roads in the form of PM_{10}. Since the operation is crushing, most of the PM is likely in the PM_{10} fraction, not $PM_{2.5}$. This source likely has little effect of the ambient $PM_{2.5}$ is the area.

Darling International, Inc.

The facility is a rendering operation located at 3350 Greenfield Road, Melvindale, Wayne County, Michigan. It is approximately two miles southwest of the Dearborn monitor. This facility has two permits, one for the three boilers in operation at the site and the other permit covers processing operations. As of 2004, to address numerous odor complaints, the facility does not "render" animal carcasses at this location. All carcasses are packaged and sent to another location (Coldwater, Michigan) for processing.

Rendering is a process that converts waste animal tissue into stable, value-added materials. Rendering can refer to any processing of animal byproducts into more useful materials, or more narrowly to the rendering of whole animal fatty tissue into purified fats like lard or tallow. The majority of tissue processed comes from slaughterhouses, but also includes restaurant grease and butcher shop trimmings. This material can include the fatty tissue, bones, and offal, as well as entire carcasses of animals condemned at slaughterhouses, and those that have died on farms.

However, the facility continues to process grease and oils taken in from local restaurants. This includes cooking off the water and filtering any solids remaining in the grease.

Power Plants

Detroit Edison has two power plants in the area. One plant has very tall stacks (>350 ft) and likely doesn't significantly affect the Dearborn monitor. The other plant has natural gas fired combustion turbines that operate only during peak demand. This source has low emissions and may not be impacting the Dearborn monitor significantly.

Small Sources

Several sources have minimal emissions (less than 5 tons) and were not evaluated. These sources include Xcel Steel Pickling, Ford Motor New Model Program, Automotive Components Holding; Envirosolids, LLC; City of Dearborn; Detroit Salt; Hinkle MFG, LLC; and DTE Energy / Ford World Headquarters.

VOC Sources

Several sources emit primarily VOCs, such as Fabricon Products, Inc., Buckeye Terminals LLC, Sunoco Partners M&T, LP (River Rouge Terminal), and Magni Industries, Inc. Since the EPA and DEQ did not find that VOCs should be evaluated for possible controls, these sources were not further evaluated.

Sources out of business near the Dearborn Monitor

Several sources that were located near the Dearborn Monitor have ceased operations. These include, M-Lok (aka Riley Plating), Spartan Industrial, Great Lakes Petroleum Terminal (Owens Corning), Ferrous Environmental, Ford Motor Clay Mine and Honeywell Industries (aka Allied Signal and Detroit Tar). Of the four sources indicated above, only Honeywell had significant particulate ($PM_{2.5}$), oxides of nitrogen (NOx) and oxides of sulfur (SOx) emissions. The Ford Motor Clay Mine had high particulate emissions due to truck traffic. The remaining two sources emitted VOCs through coating operations.

Honeywell
Honeywell (SRN B5558) is located 2.5 miles southeast of the Dearborn monitor, just north of Zug Island (US Steel). Honeywell ceased operations in 2005, with some minor emissions for volatile organic compounds as the storage tanks were emptied completely. The source permits were voided in calendar year 2005. The facility had boiler and process heater material throughputs of more than 24,801,449 million gallons in 1998 reducing to approximately 533 thousand gallons in 2004. AQD staff believes the data submitted in 1998 was reported erroneously, (i.e., may have been in gallons only) so data is not included in the review. Therefore the material throughput value for the boiler and process heaters in 1999 were approximately 2,200 million gallons of fuel oil. Please note the facility did have a coal fired boiler; however, this boiler was not in operation during the time frame under discussion.

The NOx emissions decreased from 57 tons per year in 1999 to 1.3 tons in 2004 with zero emissions reported in 2005. The SOx emissions decreased from 105 tons per year in 1999 to 25.2 tons in 2004 and again no emissions reported for 2005. The $PM_{2.5}$ emissions were reported from 2003 and 2004 and calculated using an emissions factor based on those year's submittals of 2.5 pounds $PM_{2.5}$ per material throughput. The $PM_{2.5}$ emissions were calculated for 1999 as 2.8 tons and reported at 1.4 tons in 2004 (see Figure 38 and Figure **39**).

Figure 38. Honeywell Emissions

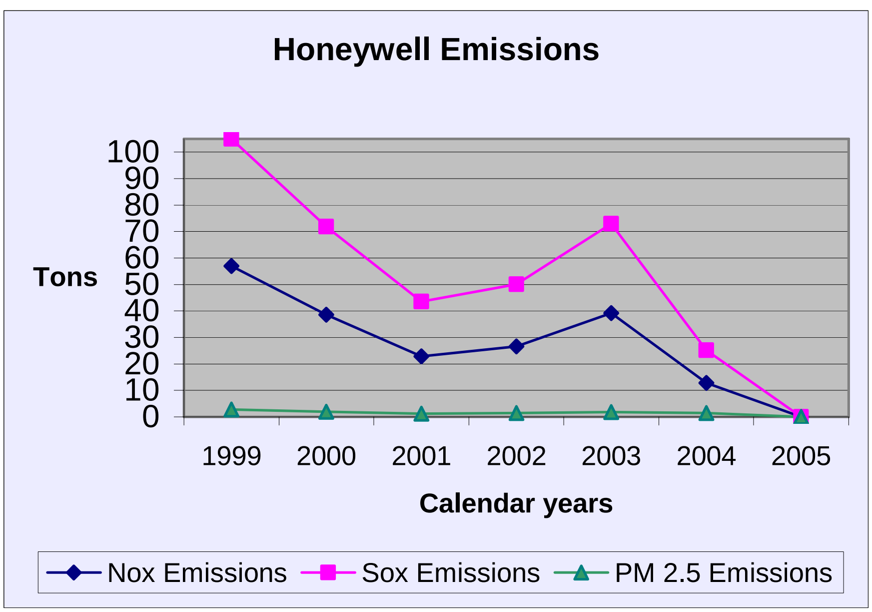
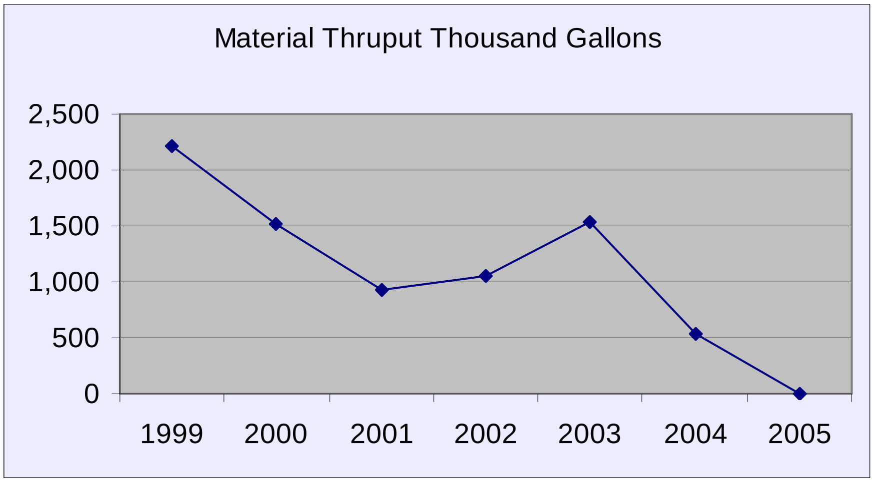


Figure 39. Material Throughput for Honeywell



Great Lakes Petroleum (Owens Corning)
This company was located about 1.5 miles south-southeast of the Dearborn monitor. It produced asphalt, was a small source of NOx (< 30 tons per year), PM (< 20 tons per year) and emitted 30-70 tons of SO_2 (see Figure 40). Owens Corning shut down their Detroit Plant on January 1, 2008. The company has had their ROP voided and will have their PTIs voided as well.

Figure 40. Emissions from Owens Corning